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Forged Steel CHOKES

Forged Steel FITTINGS

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Instead of assembling several different makes of valves, chokes and fittings in a well head manifold, thus dividing the responsibility of proper functioning and servicing of the various units among a number of manufacturers, many operators have welcomed the idea of the all-Cameron Christmas tree.

Furthermore, Cameron offers the operator the widest selection of well completion equipment, including various types of casing hangers, numerous methods of tubing suspension, both ram type and lock-screw type tubing heads, non-lubricated lift-plug valves, integrated flow wings, convertible positive-adjustable chokes, and all types of fittings.

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Want to SAVE on Instrument Maintenance? then stock versatile, dependable...

NEW! ROCKWELL CHART DRIVES

They Fit Practically All Orifice Meters and Recording Instruments

YOU SAVE 3 WAYS

1 ON INVENTORY The company that now maintains a stock of assorted chart drives of various makes and speeds will find it economical and desirable to standardize on the Rockwell. A much smaller inventory of drives need be carried—the difference being made up by the proper selection of inexpensive adaptors and turrets. The adaptors correctly position the drive in the instrument case and the turrets furnish up to 11 different rotation speeds from the same drive.

2 IN SERVICE Rockwell chart drives are exceptionally well made for long trouble-free service. They are sealed against moisture, dirt and corrosive gases; have a single winding stem. By using a heavier mainspring and a stronger winding stem, the principal causes of failure are minimized.

3 ON REDUCED MAINTENANCE Your service men need be educated on the maintenance of only one make of drive instead of many. When required, servicing the Rockwell is easy—both the winding stem with gear and the mainspring barrel unit can be replaced in a few minutes time using ordinary tools. We offer an exceptionally attractive factory repair and exchange service on completely rebuilt, fully guaranteed drives at very low cost—24 hour service if necessary.

ROCKWELL STANDARD DRIVE

Illustrating how turrets lock on to the chart arbor to change rotation speeds.

For 8-day drives, (basic rotation speed 24 hr.) Turrets will convert to 2-hour, 3-hour, 4-hour, 6-hour, 8-hour, 12-hour, 48-hour, 3-day, 7-day and 8-day rotation. The 31 day drive (basic rotation speed 7 days) converts through turrets to 15-day, 16-day, 24-day, 30-day and 31-day rotation.

ROCKWELL MIDGET DRIVE

This mighty mite fills the need for a small size, strongly constructed drive in instruments where space is at a premium. Features include detachable escapement sealed in clear plastic, phosphor-bronze bearings. Has separate mounting ring with adaptors for flexible installation. Two models—8-day wind, 24-hour rotation and 24-hour wind and rotation. Turrets for changing rotation speeds provide almost universal application.

WRITE FOR BULLETIN 1079

ROCKWELL MANUFACTURING COMPANY
Pittsburgh 8, Pa.

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Kansas City Los Angeles
San Francisco

Columbus Houston
New York Pittsburgh
Seattle Tulsa

They Say—

In a Goldfish Bowl

"We also find the surprising reaction that it's unfair competition when prices are cut and that it's collusion when prices are raised or even when prices are relatively stable and don't change.

"I'm not talking idle theory. My company is awaiting a Supreme Court decision on a suit by the Federal Trade Commission complaining that we lowered prices to jobbers in Detroit in order to meet competition. Also in Michigan, we were criticized and investigated after we raised the price of gasoline half a cent a gallon early this summer. You can see that business life gets complicated when you are attacked for lowering prices and also for raising prices.

"We have even abandoned our former policy of publicly announcing price increases in advance of the time they take effect, so that no one can infer that we are inviting our competitors to join us in price changes.

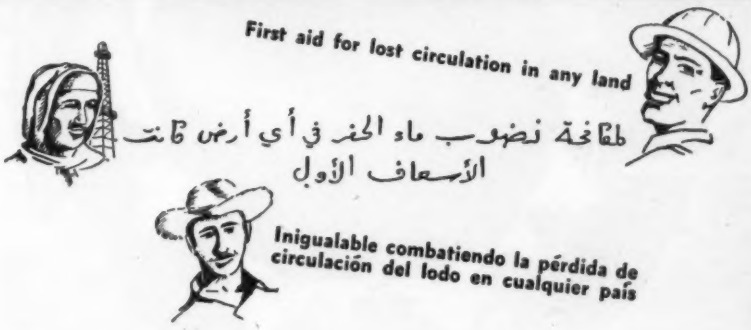
"This governmental yapping is common to the oil industry. Investigations of our activities are very popular at all government levels. For example, in the Eightieth Congress there were 57 proposals of investigations, control, or regulation of the oil industry. Of these, 19 were investigations, and 7 were actually made. In the Eighty-first Congress 46 more proposals were made, of which 10 were for investigations. For the most part such investigations have done nothing except confirm the honesty and integrity of oil companies. If ever an industry lived in a goldfish bowl, that industry is ours."

R. F. Baity, vice president of sales, Standard Oil Co. (Indiana), speaking to the Chicago Kiwanis Club.

Rockies' Progress

"Through the years, with many a set-back and alternating periods of fair weather and depressions, the Rocky Mountain region has progressed to the stage where it is an important factor in the oil supply of the nation. Today, the operators who hung on despite discouragements and mere subsistence returns, and those who came later to find the ground a little firmer under their feet as the result of the efforts of the pioneers, face the same responsibility that is upon operators throughout the United States. . . .

"This great Rocky Mountain area is prepared to play a much greater part in the petroleum-supply program than ever before. The latest estimates of discovered reserves, producible under current economic conditions,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Inigualable combatiendo la pérdida de
circulación del lodo en cualquier país

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are substantially higher in Colorado, Wyoming, and Montana than they were at the close of the last war and to them we now add Utah. . . ."

J. Ed Warren, president, Independent Petroleum Association of America, in a speech before the Rocky Mountain Oil and Gas Association, Denver.

Propane Pioneers

"We have just signed a 5-year contract with the Chicago Transit Authority to supply fuel for its 500 new propane-powered buses. I would like to point out that what this new trend in motor fuels can mean to Phillips Petroleum Co. We are in a good position if propane is accepted on a large scale as a major fuel for heavy-duty horsepower.

"Our engineers tell me that propane is one of the world's finest fuels for internal combustion engines. It won't ping. It vaporizes perfectly. It has little or no exhaust odor. It almost eliminates carbon deposits. It's easy on spark plugs. Many years of experience with L.P. gas make us a natural leader in the continued development of propane as a motor fuel.

"The present volume of gasoline being displaced by propane is still pretty small. But the trend of current developments is important. There are still many limitations. The fuel produces the best results in high compression engines, 10-to-1 or higher. . . .

"We are old hands in the propane business—even used it for motor fuel in some of our trucks nearly 20 years ago. In 1927 we pioneered the large-scale use of L. P. gas for cooking, water heating, and refrigeration. Today, we are leading the way in a new large-scale market effort—the use of propane as a motor fuel."

K. S. Adams, president, Phillips Petroleum Co., Bartlesville, Okla., writing in the November issue of "Phil-news."

CALENDAR

1951

January

American Gas Association, home-service workshop, Hotel Statler, Washington, D. C., January 3-5.

Kansas Oil Men's Association, annual convention, Lassen Hotel, Wichita, January 8-9.

Society of Automotive Engineers, annual meeting and engineering display, Hotel Book-Cadillac, Detroit, January 8-12.

Pipeline Contractors Association, annual convention, Shamrock Hotel, Houston, January 9-10.

American Institute of Electrical Engineers, Tulsa Section, meeting on explosion-proof motors, Michaelis Cafeteria, January 11.

Kansas-Oklahoma Water Flood Operators, monthly meeting, Booth Hotel, Independence, Kans., January 17.

Southwestern Legal Foundation, second annual institute on oil and gas law and taxation, Southwestern Legal Center, Dallas, January 18-20.

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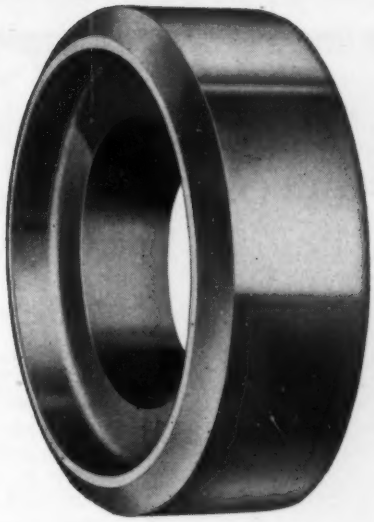

WHEN made from bar stock, this automotive part cost $150.90 per thousand. By switching to Timken® seamless tubing, the manufacturer was able to use boring tools in place of twist drills and to increase speed and feeds. This boosted production from 96 to 144 pieces per hour, with the cost savings shown here:

	BAR STOCK	TIMKEN TUBING
Material cost per 1000 pieces...	$83.19	$84.71*
Machining cost per 1000 pieces (6 spindle 2⅜" capacity automatic screw machine with estimated operating cost of $6.50 per hour)	$67.71	$45.14
TOTAL COST...	$150.90	$129.85

AMOUNT OF SAVING: $21.05, or 14%

* In most cases, Timken seamless tubing is lower in cost than bar stock, foot for foot. In this instance, it was slightly higher because of the extremely great wall thickness.

Hundreds of manufacturers of hollow cylindrical parts are reducing their costs anywhere from 10% to 35% by switching to Timken seamless tubing. Timken tubing eliminates drilling because the hole is already there. Finish boring is often your first production step. You have less stock to machine—less scrap loss. Machining cycles can be shorter, speeds and feeds increased.

Product quality is higher when Timken tubing is used. Dimensional control and finish of parts is better because internal flooding of working tools makes for cooler metal temperatures. And since the piercing process by which Timken seamless tubing is made is basically a forging operation, you get fine forged quality in your hollow parts. From tube to tube and heat to heat, this fine forged quality is always uniform because of Timken's rigid quality control.

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To get the most economical size tube for your job, guaranteed to clean up, use our Tube Engineering Service. With the tube we specify, you waste no time or material machining away excessive stock. Yet you're sure of enough metal to fill out your dimensions. It's *guaranteed.* For an analysis of your requirements, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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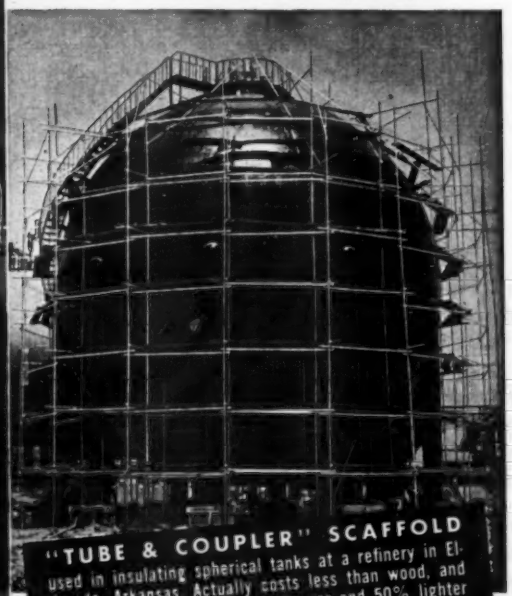

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L.P.G. Engine Fuel School, Kansas State College, Manhattan, Kans., January 21-23.

Compressed Gas Association, annual meeting, Waldorf-Astoria Hotel, New York City, January 22-23.

Northwest Petroleum Association, annual convention, Nicollet Hotel, Minneapolis, January 25-26.

Southern Gas Association, employe-relations section and accident-prevention round tables, Mobile, Ala., January 26.

Instrument Society of America, New York section, Hotel New Yorker, New York City, January 26-27.

February

American Institute of Electrical Engineers, Tulsa Section, meeting on explosion-proof electrical equipment, Michaelis Cafeteria, February 8.

American Institute of Mining and Metallurgical Engineers, annual meeting, Jefferson and Statler hotels, St. Louis, February 19-22.

Kentucky Petroleum Marketers Association, annual meeting and trade show, Brown Hotel, Louisville, February 20-21.

Kansas-Oklahoma Water Flood Operators, monthly meeting, Booth Hotel, Independence, Kans., February 21.

National Association of Corrosion Engineers, Tulsa Section, Short Course on Practical Control of Pipe-Line Corrosion, Mayo Hotel, February 21-23.

Iowa Independent Oil Jobbers' Association, Inc., annual convention, Hotel Fort Des Moines, Des Moines, February 21-22.

Wisconsin Petroleum Association, annual convention and equipment show, Milwaukee Auditorium, Milwaukee, February 27-28

March

American Association of Petroleum Geologists, Rocky Mountain Section, Shirley Savoy Hotel, Denver, March 1-2.

American Society for Testing Materials, spring meeting and committee week, Cincinnati, March 5-9.

American Petroleum Institute, division of production, southwestern district meeting, Hotel Beaumont, Beaumont, Tex., March 7-9.

Indiana Independent Petroleum Association, spring convention and refiners and suppliers exhibit, Hotel Severin, Indianapolis, March 8-9.

Mid-West Gas Association, Hotel Fontenelle, Omaha, March 12-14.

Illinois Petroleum Marketers Association, annual convention, Sherman Hotel, Chicago, March 13-15.

National Association of Corrosion Engineers, annual conference and exhibition Statler Hotel, New York City, March 13-16.

Gas Appliance Manufacturers Association, annual meeting, The Homestead, Hot Springs, Va., March 19-21.

Ohio Petroleum Marketers Association, annual convention and marketing exposition, Deshler-Wallick Hotel, Columbus, Ohio, March 20-22.

American Petroleum Institute, division of production, Mid-Continent district spring meeting, Herring Hotel, Amarillo, March 21-23.

Texas Independent Producers and Royalty Owners Association, fifth annual meeting, Beaumont, Tex., March 27-28.

New England Gas Association, annual meeting, Hotel Statler, Boston, March 29-30

April

American Gas Association, industrial and commercial gas section, conference on industrial and commercial gas, Shoreham Hotel, Washington, D. C., April 2-4.

American Society of Mechanical Engineers, spring meeting, Atlanta, April 2-5.

Instrument Society of America, New Jersey section, Essex House, Newark, N. J., April 3.

American Petroleum Institute, division of production, Eastern district meeting, Deshler-Wallick Hotel, Columbus, Ohio, April 3-5.

Mid-West Regional Gas Sales Conference, Edgewater Beach Hotel, Chicago, April 9-11.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, April 10-12.

American Gas Association, distribution, motor vehicle, and corrosion conference, Hotel Peabody, Memphis, April 16-18.

American Society of Lubrication Engineers, annual convention and lubrication show, Bellevue-Stratford Hotel, Philadelphia, April 16-18.

National Petroleum Association, Hotel Cleveland, Cleveland, April 18-20.

American Petroleum Institute, Rocky Mountain district spring meeting, Gladstone Hotel, Casper, Wyo., April 19-20.

Southern Gas Association, Buena Vista and Edgewater Gulf hotels, Biloxi, Miss., April 23-25.

American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, Society of Exploration Geophysicists, joint annual meeting, Jefferson Hotel, St. Louis, April 23-26.

Natural Gasoline Association of America, annual convention, Mayo Hotel, Tulsa, April 25-27.

Indiana Gas Association, French Lick Springs Hotel, French Lick, Ind., April 26-27.

American Gas Association, industrial and commercial gas section, industrial gas school, William Penn Hotel, Pittsburgh, April 29-May 4.

American Geophysical Union, thirty-second annual meeting, National Academy of Sciences, Washington, D. C., April 30-May 2.

American Petroleum Institute, division of refining, sixteenth mid-year meeting, Mayo Hotel, Tulsa, April 30-May 3.

May

American Gas Association, Natural-Gas Department, Dallas, May 7-8.

Independent Petroleum Association of America, mid-year directors' meeting, Cosmopolitan Hotel, Denver, May 7-8.

Gas Appliance Manufacturers Association, natural-gas department spring meeting, Dallas, May 7-9.

Liquefied Petroleum Gas Association annual convention and trade show, Stevens Hotel, Chicago, May 7-10.

American Petroleum Institute, division of production, Pacific Coast district, spring meeting, Biltmore Hotel, Los Angeles, May 10-11.

American Institute of Chemical Engineers, regional meeting, Hotel Muehlebach, Kansas City, May 13-16.

American Gas Association, operating section, production and chemical conference, Hotel New Yorker, New York City, May 14-16.

Pennsylvania Gas Association, Wernersville, Pa., May 15-17.

American Petroleum Institute, division of marketing, mid-year meeting, Cincinnati, May 28-29.

Third World Petroleum Congress, Kurhaus, Scheveningen, the Netherlands, May 28-June 6.

American Petroleum Institute, standardization and standing committees, division of production, mid-year meeting, Brown Palace Hotel, Denver, May 28-June 1.

June

American Society of Mechanical Engineers, semiannual meeting, Toronto, Ont., Canada, June 11-15.

Canadian Gas Association, Bigwin Inn, Lake of Bays, Ont., Canada, June 16-20.

American Society for Testing Materials, annual meeting, Atlantic City, N. J., June 18-22.

NOMADS

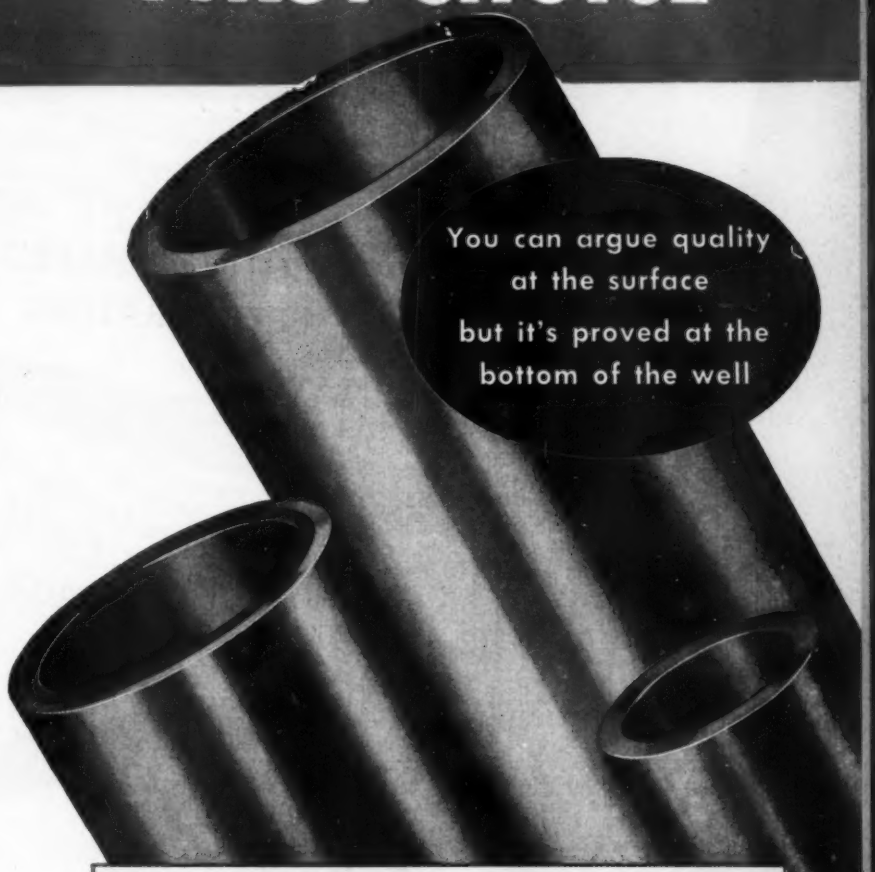
Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month. Greater Dallas Club.

Houston Nomads, second Monday of each month. Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

AXELSON
FIRST CHOICE



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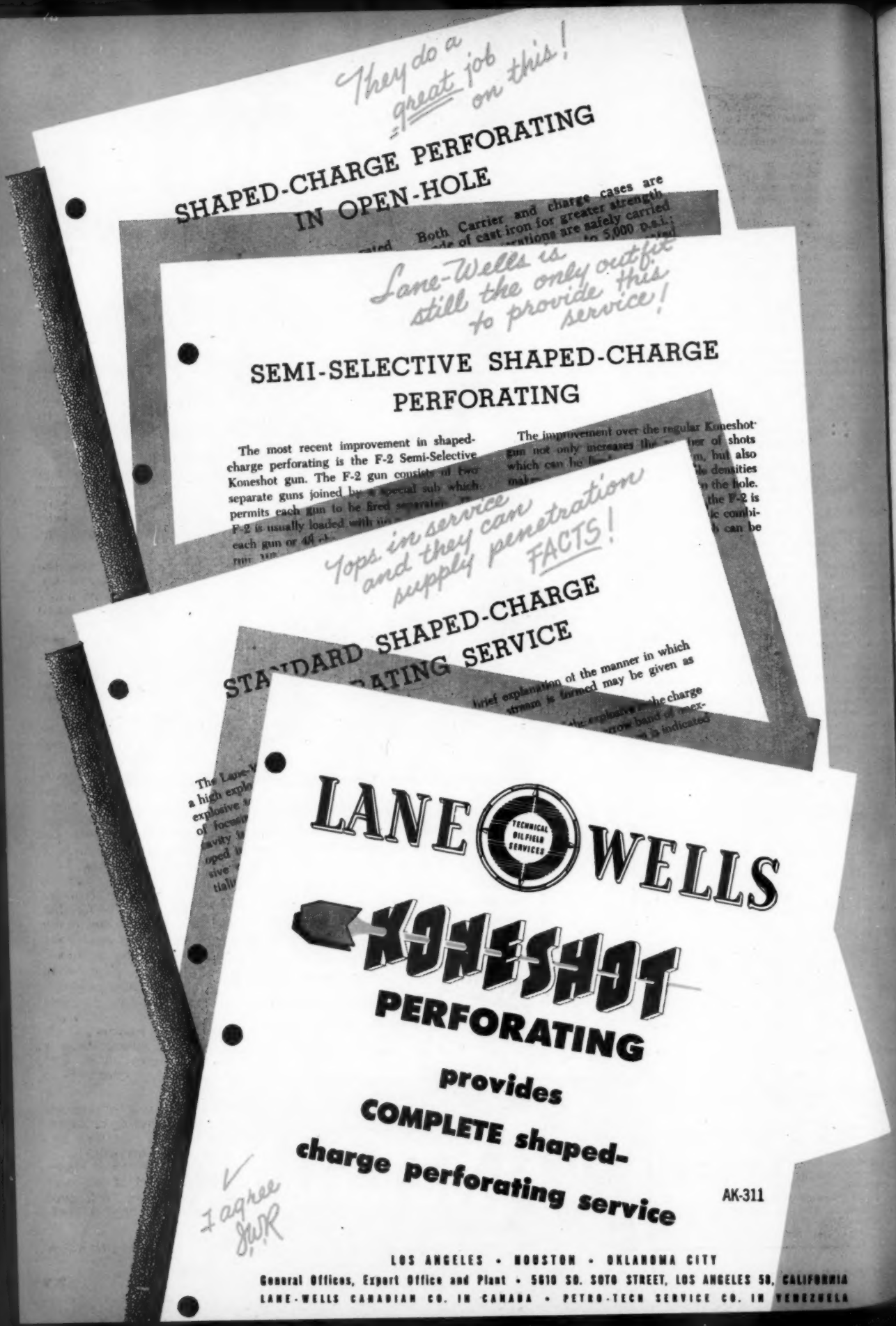
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JOURNALLY Speaking

Whodunit?

THE mystery of ths missing "e" in Kelley has finally been solved.

In our November 30 issue this department innocently referred to our perplexity over the fact that what is now Kelly-Snyder field in Scurry County originally was spelled Kelly or Kelley with complete indifference.

But then the mail started coming in. Not one but a flock of oil men have taken the trouble to inform us that the name should be Kelley in honor of Frank H. Kelley, land man for Magnolia Petroleum Co. in Colorado City, Tex., who had long plugged the possibilities of a big strike in this area.

"In order to set the records straight," wrote one of his colleagues, "Kelley field was originally named upon the recommendation of the West Texas Nomenclature Committee. The committee was motivated in recommending the field being named for Mr. Kelley because of his long and active interest in the area."

Another Magnolia man wrote: "Kelley field was discovered November 5, 1848, by the Magnolia 1 Winston Bros. The field was immediately named in honor of Frank H. Kelley. The Railroad Commission, however, used the wrong spelling in setting up its records. Very early we called the correct spelling to the attention of the commission, and the proper change was made.

"Early in 1950, however, Kelley field was combined with North Snyder field and the Railroad Commission immediately sent us word that inasmuch as a change was being made it was deemed necessary again to change the spelling of Kelley. So the Railroad Commission dropped an "e" and we of Magnolia, being very arbitrary and hard-headed about the matter, are reluctant to do so."

These Magnolia men were very nice about it, but Mr. Kelley has more vehement supporters outside of his organization. One of them wrote:

"The reference does one of the greatest injustices to the traditions I have been brought up to hold sacred in the oil business, this one concerning due recognition of an individual who believed in an area when few others did and then had the strength of his convictions borne out."

Finally we heard directly from Frank H. Kelley in person. He didn't sound a bit mad, but seemed resigned to his fate. We can't print all of his letter, but he said that the family history (dug up by a great aunt who wanted to join the D.A.R.) suggested that there may have been good reasons for changing the name.

"It seems," he wrote, "that the tribe left Northern Ireland under the name of O'Keleigh and I presume some calamity happened because they dropped the "O" and become Keleigh. Then I presume some of them ran afoul of the law and disgraced that good name and became Kelly." He explained that the second "e" got in because his father, a small-town doctor, didn't want to be thought of as a relative of a local character named Kelly.

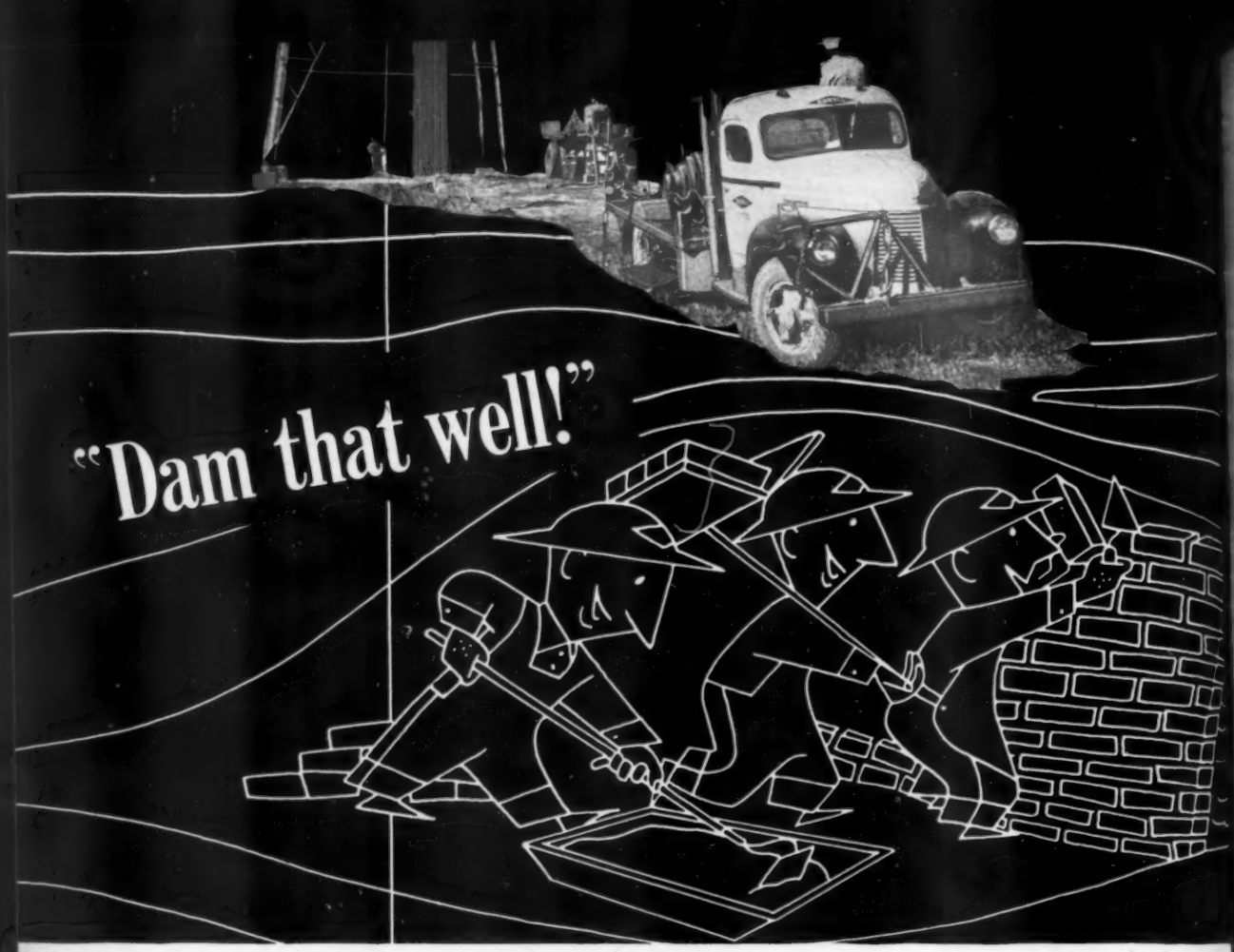
"I would like to have a correction," he wrote, "on the insinuation that the field might have been named by a geologist named Kelley, for Magnolia Petroleum Co. does have a bunch of mighty fine geologists and I do not think it is fair to them to even insinuate that an Irishman who comes from the family that has apparently stolen so many horses that they can't even keep the same name, is one of them."

We apologize to Land Man Kelley for calling him a geologist, but we think that the loss of his "e" should be charged against the Texas Railroad Commission, not us. Perhaps there is merit in the suggestion of still another correspondent, who wrote:

"Why not a couple of subcommittees under a steering or standing committee on Spellin', Nomenclature, and Whodunit?"

At any rate, none of our critics has threatened that if he ever meets up with us we "will need a new nose and plenty of beefsteak."

—Henry D. Ralph



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DANGER

DO NOT RUN packers, testers, swabs or retainers

...until the "working surface" of your casing is clean

This typical burr resulting from a gun-shot hole, clearly shows why so many operators always consider it a "must" to clean the WORKING SURFACE—the vital inner wall of casing—with the new Baker ROTO-VERT Casing Scraper.

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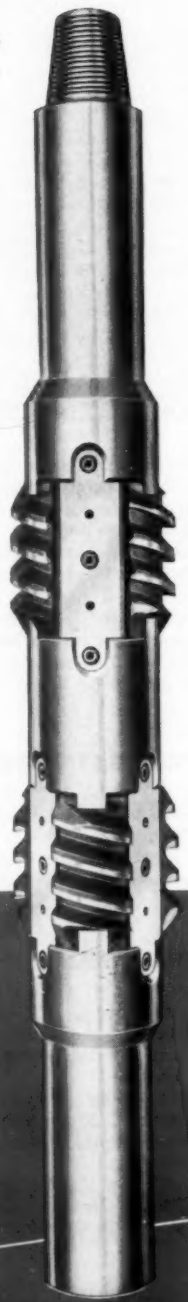

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Frozen Prices

The Government's request that the oil industry not increase prices of crude oil and refined products above the levels of early December lacks legal backing but doubtless will get general compliance.

Within a short time, it is believed, a comprehensive price-control plan will be put into effect under statutory authority, and this will include the power to roll back prices which have advanced in the meantime. From this point of view it is better to have prices frozen as of today than to go through the agony of a rollback later.

But the request took the industry completely by surprise. No general price increase was in the air, and the few scattered increases in crude or products prices were designed to cover specific local situations. With the exception of a few makes of automobiles, the Government had taken no action toward controlling prices in any other industry.

What irked the oil industry particularly was that the action appeared to single out oil for special attention and without cause. It gave the public the impression that oil was a bad actor, the first to need a public spanking. While its costs were going up rapidly and threatening to rise still more, the industry was being slapped into a strait jacket.

This feeling has been mollified somewhat by subsequent government action requesting all industries to adhere to December 1 prices and promising to roll back some recent advances which enter into the costs of other commodities. If this program is followed through, the oil industry will not be in such bad shape, relatively, even though its costs have risen both before and since December 1 and probably will rise still more even under the most theoretically perfect system of general price controls.

But the memory of 1941 is still fresh and bitter. Then the industry voluntarily refrained from raising prices at a time when its costs were going up, only to find these subnormal prices frozen for the duration of the war. For political reasons the Government felt it could not grant an advance in crude prices, however justifiable economically, and all the subterfuges, subsidies, and minor adjustments were of little help. The producing branch of the industry really suffered then.

Price control probably is inescapable in a war economy. All the oil industry asks is that it will be equitable and reasonable. To be equitable it must apply to the cost of goods and services purchased as well as to products marketed. To be reasonable it must allow some margin of profit and incentive to remain in business, and must be flexible enough to permit some adjustments, particularly those needed to bring out additional supplies of needed products or grades of crude.

It is to be hoped that this time the oil industry can have a price control based on realism, not politics.

THIS WEEK

PRICES—Government asks oil industry to freeze all crude prices at level of December 8, products as of December 18. . . . General compliance expected, but California purchasers protest requested rollback of heavy-crude postings. . . . ¶Industry assembling cost data for possible future proceedings, claiming prices of purchased materials have risen 17 per cent in recent months. . . .

STEEL—Representatives of steel companies to meet with PAD, NPA to consider PAD's request for steel to meet oil industry's needs. . . . Resistance of steel industry to PAD request based on fear that if substantial part of 11,000,000 tons oil industry is asking is granted, consumers of steel plate will be hard hit. . . .

IMPORTS—Specific allocations for imports of crude under reduced tax rate to be set up for Venezuela, Netherlands West Indies. . . . Imports in 1951 at the cut rate will be limited to 5 per cent of 1950 throughput of continental United States refineries. . . . ¶Other supplying countries will share in remaining quotas. . . .

WASHINGTON—Committee appointed to make study of oil and gas availability. . . . ¶Senate votes 2-year extension of fuel resources investigation by Interior affairs committee. . . . ¶C. Girard Davidson resigns as Assistant Secretary of Interior. . . . ¶Legislation eliminating loophole in law controlling corporate mergers heads for White House following Senate approval. . . .

INTERNATIONAL—World crude-oil production established sixth consecutive record during October with total output of 11,190,000 bbl. daily. . . . Most of the increased production occurred outside the United States. . . . ¶ECA to suspend Marshall-plan aid to Britain on December 31.

NATURAL GAS—General move by state commissions to establish minimum well-head prices for natural gas is expected following Supreme Court's decision upholding Oklahoma's minimum-price law. . . . ¶Texas Legislature to be asked to enact similar law at coming session. . . . ¶FPC indefinitely suspends its investigation of Phillips Petroleum Co.'s natural-gas operations. . . . ¶Natural gas scheduled for delivery in New York City area this week.

INDUSTRY—Negotiations under way for purchase of three California oil companies at a cost of more than $55,000,000. . . . ¶Celebration of fiftieth anniversary of discovery of Spindletop oil field to open in Beaumont, Tex., next week. . . . ¶Strong fight for congressional approval of state ownership of submerged tidelands areas due to be renewed by Texas delegation. . . .

PRODUCTION—California production set new record in November with daily average output of 960,000 bbl. . . . New record looms for December. . . . ¶Railroad commissioner forecasts record crude-oil-production volume for Texas during 1951. . . . ¶Louisiana to start new year with daily crude allowable 57,539 bbl. higher than for January 1950. . . . ¶Texas Railroad Commission rules that Col-Tex Refining Co. must purchase crude oil ratably in eight West Texas fields. . . .

ACTIVITY—Crude production for week ended December 23 averaged 5,681,100 bbl. daily, up 38,750 bbl. daily. . . . ¶Total completions decreased 16 wells to 847 for the week. . . . Wildcat completions dropped 20 wells to 152. . . . ¶Rotary rigs operating in United States on December 18 totaled 2,395 compared with 2,407 a week earlier and 2,169 on same date last year. . . .

TRENDS—Stocks of kerosine, distillate, and residual fuel dropped 18,962,000 bbl. in 3-week period ended December 16, or 1,514,000 bbl. more than last year. . . . ¶Production of same products increased 6,343,000 bbl., or 8 per cent over same period in 1949. . . . ¶Stock reductions in the last 2 weeks of the period averaged more than 1,000,000 bbl. daily. . . .

FINDING COSTS.—Costs of finding and producing oil, and of all other operations in the industry, have been rising but prices of crude and products are now frozen. This seismograph crew of Cities Service Oil Co., exploring in Louisiana swamps, illustrates some of the heavy costs involved in locating new oil reserves to replace current high production.

Price Freeze

Government asks oil industry to hold December 8 prices on crude, December 18 on products; some rollbacks talked

Bertram F. Linz

WASHINGTON.—The Economic Stabilization Agency last week sent telegraphic requests to 40 major refiners that they hold crude and product prices to December 8 levels; 24 hours later a general call was issued to all industry to maintain the December 1 price structure, and the resulting confusion has not yet been entirely dissipated.

As the industry was asked to maintain its price levels, six West Coast refiners were asked to rescind a recent 25-cent increase in the price of low-gravity crude and, upon their refusal, were called to Washington for conferences.

Clarification.—By Christmas, Orville D. Judd, ESA oil chief, felt that he had straightened the situation out, as follows:

December 8 is the cutoff point for crude prices, regardless of the general call for December 1 levels. That date would protect an increase in the price of Pennsylvania Grade crude, then just about to go into effect.

December 18, the date of the request, is the deadline for refined-product prices, because of the terms in which the hold-the-line request was couched.

A decision will be made shortly whether to order the West Coast refiners to roll back their crude prices.

California problem.—The increase in West Coast crude prices was announced by Union Oil Co. October 23, and five others finally met it this month. Company representatives who came to Washington explained that the price increase was based on increased labor costs and recent sharp increases in demand. To meet the latter, they said, low-gravity-crude prices were raised to encourage producers to operate marginal wells.

ESA officials said the discussion was purely exploratory and that no specific determination had been reached, but the question will be considered promptly and the industry will be advised as soon as a conclusion is reached. Some of the company men present at the meeting, however, expressed the belief ESA may ask that prices be rolled back to October 23.

Meanwhile, increases in retail gasoline prices in some areas brought from Judd a warning that further raises might precipitate quick imposition of controls, although the ESA would prefer to have time for a complete study of the situation before acting.

Standards set.—In its appeal to all industry and business voluntarily to adhere to December 1 price levels, the ESA laid down standards to be followed in making "permissible" increases.

In general, the ESA held that prices may not be increased by any manufacturer or producer whose net dollar profits before taxes are equal to or in excess of average net profits before taxes in the 1946-49 period, except as follows:

1. As to individual material or service sold by a company whose net over-all profits are running above the general earning standard as set out above, the price of such product or service may not be increased if it is being sold at a profit. If not profitable, the price may be increased but in no case by more than the lesser of (a) the amount necessary to make it profitable or (b) the amount of the increase since June 24, 1950, in the cost of direct wages and materials.

2. As applied to wholesale and retail trade, gross margins may not be increased above the June 1950 level if net dollar profits before taxes are equal to or in excess of the average profits before taxes in the 1946-49 period.

3. Distributors may not increase their prices on the basis of increases in replacement costs or market costs, and margins may be added only to inventory cost actually paid.

Only actual costs.—In determining whether a price increase is permissible under these standards, it was explained by Price Stabilization Director Michel V. DiSalle, sellers must base their determination only upon actual experience and will not be permitted to raise any price on the basis of a forecast of conditions that may prevail at some later date or of costs which are estimated without experience.

Rollback considered.—DiSalle warned that any official price action taken later by the ESA will make use of a base period ending not later than the dates given in the request for voluntary control, and therefore no seller will derive any advantage from price increases after those dates. Prices of certain basic materials which were increased between June 24 and December 1 will be rolled back where necessary to make possible the maintenance of December prices at later stages of manufacture.

The price administrator emphasized that the standards do not limit profits except as increased profits would be generated by price increases. There is no intention to control profits which accrue through increased volume or economies in operation, he said.

DiSalle also expressed the belief that the standards will not apply to tanker rates.

Abnormal costs.—In another quarter it was disclosed that aviation gasoline purchased by the military through normal channels has been increased by 3 to 3.2 per cent over the pre-Korean price on the Gulf Coast and 13 to 14 per cent on the West Coast, while supplies obtained from marginal sources are from 5 to 45 per cent higher. The latter increases, according to a recent report by the secretary of defense, are due to the fact that these marginal operations "are not economical under normal conditions" but have been necessary in order that the military could secure adequate supplies. Part of the increase in cost is attributable to transfers of components between refineries, involving heavy transportation expense.

Price Compliance

Industry leaders agree to hold present rates

Dahl M. Duff

NEW YORK.—The petroleum industry's willingness to hold the line on prices, at least for the time being, was indicated last week by officials of major oil companies in New York.

Three companies disclosed they had responded favorably to the appeal of the Economic Stabilization Agency to hold in abeyance any contemplated price increases and to give 7 days' notice of any pending price action. Reports were that other companies east of California had made similar replies to the Government.

George V. Holton, board chairman of Socony-Vacuum Oil Co., Inc., wired Michel V. DiSalle, ESA price administrator, that the company was not now contemplating any price increases and assured him the requested notice would be given if price raises were found to be an economic necessity.

Officials of Sinclair Oil Corp. said that company would comply with the Government's request. Eugene Holman, president of Standard Oil Co. (N. J.), indicated that the operating affiliates of the Jersey organization would follow the government plea.

No general increase.—It was reported

that in all some 40 oil companies received telegrams from DiSalle in the Government's program to freeze prices at a December level. In the trade, it was generally agreed that the Government's action had cut the ground from under the growing possibility of a general increase in crude-oil prices.

DiSalle's telegrams and the oil-company replies, however, left considerable confusion, particularly in regard to products prices and the prospective rollback in California. Several different dates, December 1, December 8, and even December 18, were mentioned as the cutoff time for the price freeze.

Flexibility needed.—The difficulty involved in an inflexible price freeze was pointed out by what happened in California. Union Oil Co. raised its prices last October, and other companies did not follow until December 13. On one hand, a government freeze as of December 1 would leave Union with its higher prices. On the other hand, it would be inadvisable in one particular situation to use the much earlier October date.

Recent price increases of fuel oil in the Chicago area were understood to be under scrutiny of the government agency. In the East, the market has been tight but has been holding at existing levels without change.

Just what the price freeze would do to the traditional seasonal fluctuations in products quotations was another subject of speculation. There was some feeling that the industry could make out a good case for permission to continue season price variations in motor fuel and heating oils, so long as they are not excessive. Such price changes are for the purpose of bringing out additional supplies and encouraging necessary adjustments of refinery yields.

Cost factor.—Although a higher crude-oil price is, in the opinion of many leading executives, thoroughly justified, the prospect of obtaining one under present conditions is considered almost nil. A record-breaking profit performance is expected to be turned in by the industry this year, and under the Government's announced standards this virtually precludes a higher crude price.

The justification for a crude increase comes on the basis of costs. These have risen sharply in almost every category in the 3 years since the last rise in the price of crude. Putting a dollar-and-cents figure on crude finding and producing, however, is extremely difficult. There are so many variables as between companies, fields, and even individual wells in a field.

During the days of the old Office of Price Administration, months of effort went into the report of an industry committee which presented the case for a raise in the crude price in 1946. To prove the necessity of an increase at the present time to officials in Washington, who are determined to hold the price line in general, would require an even greater effort.

Consultation asked.—A request that DiSalle appoint a petroleum-industry advisory committee to consult with the agency on its petroleum pricing actions was made in a telegram sent last week to the price-stabilization director by the Atlantic Coast Oil Conference, a marketing organization. Harry B. Hilts, secretary of the conference, told DiSalle: "Because there is much more to the price structure of crude oil and petroleum products than the matter of profits and because of these many broader implications and the resulting effect on our whole defense economy, we strongly urge full cooperation between your agency, the Petroleum Administration for Defense, and the National Petroleum Council in considering any further action in connection with the control of the petroleum prices."

Hilts in his wire recommended that the proposed industry advisory committee include representatives of the various segments of the industry and that independent suppliers, jobbers, and distributors be given adequate and geographical representation.

Oil Costs More

Producers prepare to counter price freeze with data on rising costs; one study shows materials up 17 per cent

Henry D. Ralph

TULSA.—First reaction of Mid-Continent oil operators to the Government's request to freeze oil prices was surprise and anger that petroleum had been singled out for attention.

This was modified somewhat when later Washington reports indicated that the Government would attempt to freeze all commodity prices at December 1 levels and might roll back prices of some basic materials to earlier and lower quotations.

Prices of crude oil in the Mid-Continent area have remained stable for 3 years and so far as could be learned there was nothing to indicate that a general price advance was imminent, although several industry leaders have complained that recent increases in production costs would justify higher oil prices.

Discrimination suspected.—In view of this fact and of the Government's apparent indifference—until last week—toward rising prices for steel and other commodities, oil men were stunned by the word that telegrams had been sent to 40 leading refiners asking them to make no increases in prices of crude oil or refined products. It looked like discrimination, and political motives were suspected.

The prevailing view was that the industry would, of course, comply with the request to hold the line on prices but would not remain silent if it developed that oil producers were caught in a squeeze between rising costs and an inflexible price ceiling. A number of companies immediately began assembling data on costs to substantiate any possible future appeal for price adjustments.

Costs rising.—A study made by one major company stated that the recent advance in steel prices set off an avalanche of price increases in practically all materials used by oil companies. Since December 1, 1950, the weighted average cost of materials and supplies purchased by oil companies has increased 6.7 per cent, and during a period of about 2 weeks there have been hundreds of price increases.

While this recent jump was spectacular and alarming, the trend has been evident for many weeks. The same major-company study showed that from January 1 to December 1, 1950, the weighted average cost of all materials purchased for an integrated oil operation increased 9 per cent. The price advances during December bring the year's increase to 17 per cent.

This study declared that the same prices would increase at least another 10 per cent next year without government controls and probably 5 per cent even with controls, and concluded that the oil industry is faced with an increase in materials costs of 20 or 22 per cent in 1951 as compared with 1950.

In addition, labor costs will be higher in 1951. In October 1950 most major companies increased wages by 6 per cent, and this increase is becoming more or less general.

Prices stable.—On the other hand, the general level of crude prices has not changed since December 1947. The most frequently used quotation is $2.65 per barrel for Oklahoma and Kansas crude of 40° gravity and above. The national average crude-oil price is now given as $2.54 per barrel, whereas 2 years ago it was $2.59. The government index of petroleum and petroleum-products prices has increased 5 per cent during the past 3 years, and this increase was practically all in products.

On the basis of cost figures such as these, most operators were of the opinion that the price of crude should be advanced by 25 or 30 cents per barrel in order to keep the producing branch of the industry in the same position next year as it was in 1950.

Steel Discussions

Company representatives to meet with PAD, NPA officials to consider PAD's request for steel for oil operations

Bertram F. Linz

WASHINGTON.—Representatives of the steel producers are scheduled to meet again this week with officials of the Petroleum Administration for Defense and the National Production Authority for further discussion of PAD's request for steel for oil industry operations.

The figures were canvassed at meetings last week at which, it was reported by Deputy Administrator Bruce K. Brown, the steel representatives who first expressed the belief that the estimates were highly inflated changed their minds and agreed that the figures for those categories of steel normally charged directly to the oil industry were definitely realistic.

The meetings were suspended in order that the steel men might take the figures home and break them down to 17 groups in each of 3 categories which would permit direct comparison of the estimates with previous actual shipments.

Meanwhile, tentative agreement has been reached on proposals to earmark 5 per cent of the tubular goods produced by the mills or held in warehouses for operators unable to secure supplies through normal channels and an effort now is being made to develop a formal arrangement in terms satisfactory to PAD, NPA, and the pipe producers.

Steel's resistance.—Steel-industry resistance to PAD's request is based on the fear that if even a substantial part of the 11-plus million tons the oil industry is asking is granted consumers of steel plate will be hard hit, and if sheet and strip mills switch to plate production to fill requirements of such a program deeper cutbacks would be necessitated in sheet and strip.

PAD officials also are meeting with the tanker industry to work out a program under which the Military Sea Transport Service would get more vessels and plans are being worked out by a drafting committee set up by Brown following a conference with 45 to 50 tanker operators.

Discussing the transportation situation informally, Brown also expressed the opinion that the industry will need even more pressure tank cars than will be produced under the car-building program initiated last month by NPA if it is to meet the requirements for L.P.G. and avgas service.

The first two applications for necessity certificates for accelerated amortization were returned to the National Security Resources Board last week with recommendations that a 100 per cent certificate be approved for improvement of an existing alkylate unit and one for less than 100 per cent be approved for a petroleum-storage terminal at an unidentified location where there is a critical civil supply situation.

Appointments made.—Brown announced that Robert N. Sears, assistant to the president of Phillips Petroleum Co. who served as assistant director of the program division of Petroleum Administration for War, has taken a similar position with PAD, while Phil Cox, Washington engineering consultant, has joined the materials division, and George Gibson, of Bechtel Corp., has been brought in as assistant financial counselor.

In the near future, Brown said, he hopes to be able to name the independent crude producer who will serve as director of the production division, and a general counsel, who will not be an oil man but a Washington lawyer familiar with government law and procedure, reportedly from the Department of Justice.

Brown disclosed that there has been some talk of the possibility of moving Elk Hills oil to the West Coast to supplement California production although there have been no definite developments. However, he said, a representative of the Director of Naval Petroleum Reserves is expected to come in to PAD sometime next month for general discussions at which the subject may be touched upon.

Brown said California oil men believe the state has enough oil to meet civilian needs for the next few years but if an emergency develops and military requirements from the area increase substantially it may be necessary to import oil to supplement local supplies.

Other developments.—There were developments in other phases of the defense program during the week. The National Security Resources Board set up an 11-man scientific manpower advisory committee to advise the board on matters related to the efficient utilization of scientific and technological personnel, one member of which is Everette Lee DeGolyer, Dallas oil geologist, engineer, and consultant.

The NPA issued an order cutting the consumption of tin for tin plate and other purposes to 100 per cent of the rate of use during the first half of 1950 during the month of January, and to 80 per cent of that rate for February and March.

Oil-Import Quotas

Specific allocations for imports at reduced tax rate to be set up for Netherlands West Indies, Venezuelan crude

WASHINGTON. — Specific allocations for the importation of oil at the reduced tax rate of 10½ cents per barrel will be set up only for Venezuela and the Netherlands West Indies when abrogation of the Mexican trade agreement becomes final next week and the provisions of the Venezuela agreement are revived.

The 1951 imports at the cut rate will be limited to 5 per cent of the 1950 throughput of continental United States refineries in accordance with the terms of the agreement with Venezuela signed November 6, 1939. The agreement provides for a rate of ¼ cent per gallon on crude, topped crude, and fuel and gas oil on an annual quota of imports based on domestic refinery operations, with a tax of ½ cent per gallon on imports above the quota.

The two specific allocations which are to be set up will be based on the average imports from Venezuela and Netherlands West Indies during the period 1946-49, inclusive. Venezuela will be given 58.4 per cent of the total import quota and Netherlands West Indies 18.7 per cent. In both cases the allocations will be smaller percentagewise than they were between 1940 and 1943, when Venezuela had 70.4 to 71.9 per cent and Netherlands West Indies 20.3 to 21.3 per cent, but actual volume will be greater because of the much larger domestic refinery output on which the quota is based.

Other countries.—All other supplying countries will share in the remaining 22.9 per cent of the quota on a catch-as-catch-can basis. Determination not to divide this segment of the quota was based on the fact that imports from Kuwait have been coming in in volume only since the latter months of 1948, 5,600,000 bbl. came in from Iran in 1948-49, and receipts from Iraq have been sporadic. In addition, consideration was given to the possibility of substantial imports from Canada which it was felt should not be foreclosed from the benefits of the reduced rate.

A proclamation setting forth the terms under which imports will be

subject to the reduced rate is expected to be issued by President Truman this week, and the Treasury Department, on the basis of Interior Department statistics, will set the quota for 1951.

Quota estimated.—The quota is estimated roughly to run around 100,000,000 bbl. or slightly greater. Imports for the current year are expected to run around 240,000,000 bbl. to 260,000,000 bbl.

On the basis of a 100,000,000-bbl. quota, the percentages to be given Venezuela and Netherlands West Indies would provide about 58,400,000 bbl. for the former and 18,700,000 bbl. for the latter, with most of the remaining 21,300,000 bbl. coming from Saudi Arabia and Kuwait.

Oil, Gas Committee Formed

WASHINGTON.—Appointment of a committee with three subcommittees to make a study of oil and gas availability requested by the Interior Department early this month was announced last week by Chairman Walter S. Hallanan of the National Petroleum Council.

The purpose of the study is to develop full information on present and probably future petroleum productive capacity and availability to the United States which will include gas as well as liquid petroleum from foreign as well as domestic sources. It is designed to supplement a report submitted by the council last January on domestic crude-productive capacity which Secretary Oscar L. Chapman said should be expanded "in view of the present situation and because of the significance of oil and gas to the national security and defense."

The three subcommittees will make studies, respectively, of domestic oil and gas availability, future domestic oil and gas availability, and foreign petroleum availability. The committee will be headed by L. F. McCollum, Continental Oil Co., Houston. Hines H. Baker, Humble Oil & Refining Co., Houston, will serve as chairman of the subcommittee on domestic oil and gas availability; Max W. Ball, Washington, will head the future domestic oil and gas availability subcommittee; and John R. Suman, Standard Oil Co., (N. J.), New York City, will serve as chairman of the subcommittee on foreign petroleum availability.

Fuel Study Extended

WASHINGTON.—The Senate last week voted a 2-year extension of the investigation of our fuel resources by the Interior affairs committee and set January 3, 1953, as the final date for submission of a report and recommendations for a national fuel policy.

The investigation was originally ordered by the Senate last August 15, when it approved a resolution sponsored

WATCHING WASHINGTON

Bertram F. Linz

No. 1 Problem

Expansion of steel-production capacity, possibly the nation's No. 1 production problem, is not a matter of just throwing up new plants but a question of ore and alloy availability, supplies of other materials, and adequacy of labor and transportation facilities, all of which must be added up to reach the amount of steel that can be produced.

The industry believes these factors will support the output of 110,000,000 tons a year which it is aiming to reach by the end of 1952, but there is some uncertainty as to how much further production can be expanded in the light of the necessity to import much of the alloy material required, a labor market reduced by the maintenance of a large armed force, the limitations of our transportation system, and a possible shortage of scrap, essential to steel making and currently used in the ratio of 47 per cent to 53 per cent of pig iron.

The 10,000,000-ton expansion now under way will require between 12,250,000 and 15,000,000 tons of additional ore supplies; additional supplies of scarce alloy ores obtainable, in some instances, chiefly or only in foreign countries, including Russia; more than 40,000,000 tons of scrap, limestone, fluorspar, coal, coke, and fluxes; something like 65,000 additional workers; large volumes of building materials and supplies—it takes 3,000,000 bricks to line a single blast furnace; and additional transportation facilities to move both raw materials and finished products, including 30 new lake vessels.

Aside from these material requirements is the equally important matter of cost. It costs just about twice as much to build blast furnaces and other steel-making facilities as it did in 1939 and more than four times as much to build a Great Lakes steamer.

Transportation Study

No quick decision is expected to be made by the Petroleum Administration for Defense on the two applications now pending for necessity certificates permitting accelerated amortization of proposed pipe lines from West Texas to California.

A thorough study of the whole oil-transportation situation is now under way, and no applications for certificates for pipe line will be acted upon until it is completed and a decision can be reached as to what projects are necessary for the defense program. Also, in the case of west-bound lines, action will be deferred until there is a clear picture of probable requirements on the West Coast as the defense program progresses.

The pipe-line situation is highly involved because of the limited capacity of pipe mills, the steel requirements of the oil and gas industries in which several of the lines now proposed were not considered by the National Petroleum Council steel committee in drafting its estimates, and the big question of availability for new large-diameter lines on top of present commitments.

Unless given specific allotments of line pipe, projects now being drafted could not expect to secure pipe for many months from mills already booked far ahead. The big problem that PAD and the National Production Authority must work out in deciding what lines shall be built is where oil would be most urgently needed in the event of any interruption of foreign supplies, a possibility that cannot escape consideration in view of the precariously balanced international situation.

Important Session

The Eighty-second Congress will convene next week for what is expected to be the most important session since the early days of World War II.

The new Congress, in which the Democrats will have little more than nominal control and in which the administration will have none except by grace of the so-called states' rights Southerners, is expected to embark immediately upon the consideration of measures designed to strengthen the war potential of the nation, but a number of matters of purely industrial interest also are scheduled to be taken up.

A focal point of interest will be the legislation dealing with appropriations and taxes. With respect to the former, anticipated to run anywhere up to $60,000,000,000 or more, the Republicans are expected to demand a sharp reduction in spending by the Government for nonmilitary activities which it is contended can be cut by at least $5,000,000,000 without affecting essential projects.

A new round of tax increases for individuals, and possibly also corporations, is in the cards.

sored by Sen. Francis J. Myers of Pennsylvania following hearings on coal-industry complaints that imports of fuel oil were killing the coal market along the eastern seaboard. The committee was unable to make the study in the 4½ months given it.

At the same time, the Senate approved a 1-year extension of investigations of the defense program by the Committee on Armed Services and authorized the Interstate commerce committee to make a full and continuing study and investigation of export policies and control regulations.

The export-control investigation will include the policing of the Government's efforts to prevent the shipment or transshipment of exported materials to countries unfriendly to the United States and an investigation of the extent, if any, to which American carriers have been or are being used in such transportation.

Revival of WDC Sought

WASHINGTON. — Legislation reviving the War Damage Corporation which insured American property owners against losses through enemy attack in World War II has been approved by the House banking committee, and an effort will be made to secure its enactment before the end of the year.

The WDC would be operated by the Reconstruction Finance Corporation and would have a capitalization of $1,000,000,000. It would insure property against damage from enemy action, providing supplementary coverage which, when written in conjunction with standard property-damage-insurance policies, would give complete coverage of possible losses through enemy attack.

The need for war-damage insurance was emphasized by the report by the National Security Resources Board that the average American city is as susceptible to bomb and fire damage as those of Germany and Japan. A study of five large American cities showed that from 96 to more than 99 per cent of the structures were of combustible construction, and the structural arrangement of cities determines whether wartime fire attacks will produce fire storms and conflagrations.

Pricing Charges Denied

WASHINGTON. — Five Standard Oil companies and Atlas Supply Co. entered a general denial last week to charges by the Federal Trade Commission of conspiracy in restraint of trade and unlawful receipt of brokerage fees and price discriminations.

The oil companies admitted that the common stock of Atlas is jointly owned by them and that they have the sole voting power and receive dividends, but specifically denied that Atlas has acted as their agent, representative, or intermediary in transactions challenged by the commission or is subject to their control.

The companies also denied that Atlas is the "instrumentality by, through, or in conjunction with which said 'Standard Oil Companies' exert the influence of their combined purchasing power on their vendors of TBA products," as charged by the FTC.

Merger Law to White House

WASHINGTON.—Legislation eliminating a loophole in the law controlling corporate mergers was headed for the White House this week after approval by the Senate of a bill passed by the House of Representatives earlier this year.

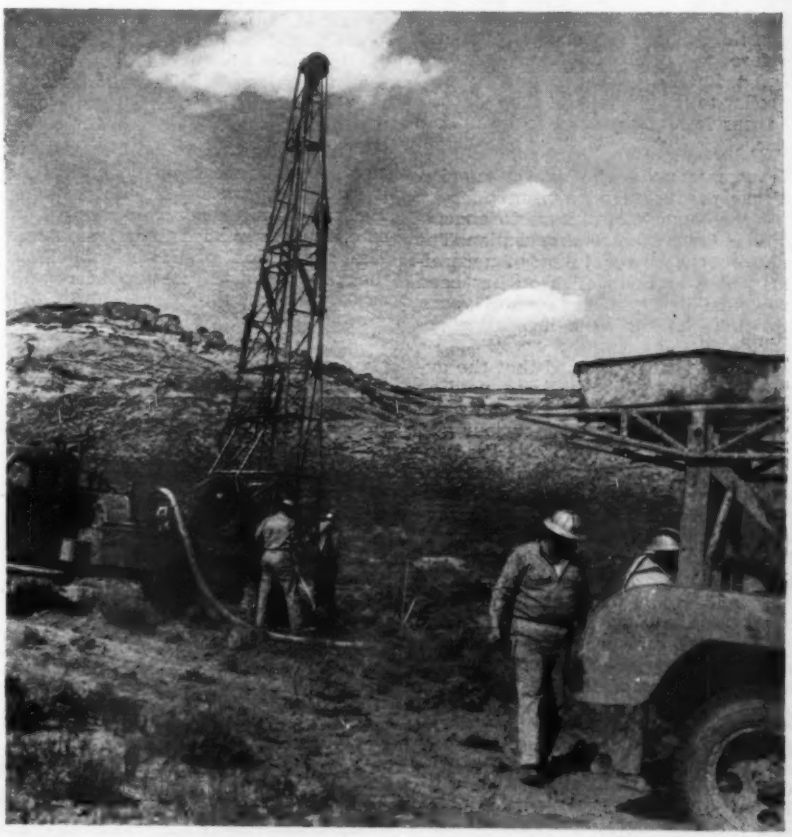
The measure would prohibit a corporation from merging with another by acquisition of the latter's physical assets where such action would substantially lessen competition. It complements a law enacted many years ago forbidding mergers tending to promote monopoly through the acquisition by one corporation of another's stock.

Davidson Resigns Post

WASHINGTON.—C. Girard Davidson, Assistant Secretary of the Interior in charge of oil and minerals, resigned last week to return to Portland, Ore., to engage in the practice of law.

As administrative head of the Bureau of Mines, Geological Survey, and Oil and Gas Division, Davidson played an important part in developing department policy on petroleum and strongly supported the idea the Government should take a broad direct role in oil activities.

A native of Lafayette, La., Davidson served with both the Tennessee Valley Authority and the United States Housing Authority. During the war he was assistant general counsel for the War Production Board before joining the Interior Department as assistant secretary in 1946.



Wind River Exploration

A portable drilling rig is used by a Cities Service Oil Co. seismograph party exploring the Wind River Valley in Wyoming, where widespread seismic activity is under way. Much of this country is already beginning to feel the icy fingers of winter, but oncoming snows will not stop the operations, as exploratory work is carried on in all kinds of weather.

Minimum Gas Prices

Supreme Court action upholding Oklahoma statute may prompt other states to set price of gas at well head

Henry D. Ralph

A GENERAL move by state commissions to establish minimum well-head prices for natural gas in the near future is generally expected as a result of the Supreme Court decision upholding Oklahoma's minimum-price law.

Oklahoma had set a minimum price of 7 cents per thousand cubic feet for gas produced in the Guymon-Hugoton field. Applications are pending before the Corporation Commission for orders setting minimum prices in other Oklahoma fields.

Under a somewhat similar statute the Kansas Corporation Commission set a minimum price of 8 cents per M.c.f. for gas produced in the Kansas portion of Hugoton field. The constitutionality of the Kansas action is questioned in another case pending before the United States Supreme Court, but the issues involved are so similar to the Oklahoma case that the Kansas law is expected to be upheld also.

Texas may act.—In Texas a number of gas producers are laying plans to ask the Texas Legislature to enact a similar law at the coming session. The matter of state regulation of natural-gas prices at the well head has been discussed in Texas for several years, but there has been no legislative action.

A recent check showed that the average well-head price being paid in Texas in May 1950 was 4.86 cents per M.c.f. for sweet gas, 4.17 for sour gas, and 3.4 cents for casing-head gas produced with oil. Many recent sales contracts carry much higher well-head prices for natural gas, but these averages show the discrepancy from the 7 and 8 cents set in the Oklahoma and Kansas portions of Hugoton field.

The actions of the Kansas and Oklahoma legislatures and commissions were based on conservation of gas, and it was on this ground that the Supreme Court of the United States upheld the Oklahoma statute and order.

Conservation.—In the Oklahoma proceedings the commission heard testimony to the effect that the field price of gas has a direct bearing on conservation. Witnesses testified that low prices make enforcement, and result in abandonment of wells long before all recoverable gas has been extracted. They also testified that low prices contribute to an uneconomic rate of depletion and economic waste of gas by promoting inferior uses.

The commission concluded that there was no competitive market for gas in Guymon-Hugoton field, that the integrated well and pipe-line owners were able to dictate the prices paid to producers without pipe-line outlets, and that as a result gas was being taken from the field at a price below its economic value. It also concluded that the taking of gas at the prevailing prices resulted in both economic and physical waste of gas, loss to producers and royalty owners, loss to the state in gross-production taxes, inequitable taking of gas from the common source of supply, and discrimination against various producers in the field.

Court approves. — These conclusions were not questioned by the Supreme Court. In a decision written by Justice Clark, the court said:

"It is now undeniable that a state may adopt reasonable regulations to prevent economic and physical waste of natural gas.

"That a legitimate local interest is at stake in this case is clear. A state is justifiably concerned with preventing rapid and uneconomic dissipation of one of its chief natural resources. The contention urged by appellant that a group of private producers and royalty owners derive substantial gain from the regulations does not contradict the established connection between the orders and a state-wide interest in conservation."

The Oklahoma order came before the Supreme Court in two cases. In one case Cities Service Gas Co. protested the minimum-price provision of a ratable-take order requiring it to purchase gas from Peerless Oil & Gas Co. In the other case Phillips Petroleum Co. protested the order as applied to gas produced from its own wells and processed by itself.

Applies to all.—On this point the Supreme Court said:

"The distinction is without a difference. The connection between realized price and conservation applies to all production in the field, whether owners purchase from others or not, and whether they own pipe lines or not. In a field which constitutes a common reservoir of gas, the commission must be able to regulate the operations of all producers or there is little point in regulating any."

These decisions would indicate that producing states are free to establish minimum prices for gas, field by field, so long as the orders can be shown to promote conservation and are not arbitrary or unreasonable.

FPC attitude.—There remains, however, the question of whether the Federal Power Commission will remain silent while field prices are being jacked up. On several occasions the FPC has indicated that it might attempt to fix field prices itself. In effect it has already done this as to gas

Dry and Abandoned

The photographer who took this shot said nobody prints a picture of a dry hole, although 13,637 of them were drilled in the United States in first 11 months of 1950. Here the well has been capped and the rig is being moved away, writing finis on the unsuccessful expenditure of thousands of dollars. The public little realizes that about 34 per cent of all wells drilled result in nothing but the sad statistical notation "dry and abandoned." The Journal's monthly report on well completions appears in this issue on page 122.

produced by interstate pipe-line companies in that it allows such companies to include in their operating costs only the "utility profit" (usually 6.5 per cent) on the actual costs of producing their gas.

If state commissions now generally fix field-wide minimum prices for both purchased and company-produced gas, rates at the consuming ends of the pipe lines may go up and this may bring complaints to the FPC. As a result of President Truman's veto of the Kerr bill, the FPC claims that it has authority to regulate the price of gas purchased by an interstate pipe line from an independent producer or gatherer. However, the commission has not indicated its attitude toward field prices established by state authority.

In the Oklahoma cases the Supreme Court said:

"The Federal Power Commission has not participated in these proceedings. Whether the Natural Gas Act authorizes the power commission to set field prices on sale by independent producers, or leaves that function to the states, is not before this court."

Phillips Hearing Canceled

WASHINGTON.—The Federal Power Commission last week announced an indefinite suspension of its investigation of the Phillips Petroleum Co.'s natural-gas operations.

Announcing cancellation of hearings which previously had been deferred several times, scheduled to open in Bartlesville, Okla., January 8, the commission said a new date would be fixed at some future time, but left open a possibility that the investigation has been shelved for the period of the international emergency.

The commission's action was taken on the basis of a request filed by Phillips December 15 for suspension of the investigation during the period of the emergency because of the company's increased obligations in the national defense effort.

Transco Deliveries

Natural gas scheduled for New York area this week

NEW YORK.—After a delay of several weeks, first gas deliveries through the new Transcontinental Gas Pipe Line Corp. system were scheduled to be made in New York City this week.

The initial quantities of gas arriving in New York through the 30-in. main line from Texas were to be used by local utilities for testing purposes in their mains and plants. Full-scale deliveries are expected to start shortly after the first of the year.

Some breaks in the line resulted from high water in New Jersey which accompanied the wind storm in the Northeast late in November. These have been repaired, but thorough testing of the line with water has been continuing until recently. Even with those minor delays, the construction of the world's longest gas line is still well in advance of the April completion date stipulated by the Federal Power Commission.

Other service.—The Transcontinental system will deliver gas into Philadelphia and New Jersey cities as well as into New York and the various smaller communities along the route. The system also will meet part of the gas requirements of the new New England project of Northeastern Gas Transmission Co., but construction of the connecting line from New York City to the Connecticut border is not expected to get under way until spring.

The natural gas delivered into the Northeast is used mainly to supplant oil for enrichment purposes in existing manufactured-gas plants. In Newark, N. J., last week, a group of seven New Jersey gas utilities filed revised rate schedules with the State Public Utilities Commission estimating that the use of natural gas will result in annual savings totaling more than $3,000,000 for consumers.

Rate reductions.—The rate reductions shown were as follows:

	Number customers	Annual reduction
Public Service Electric & Gas	904,471	$1,750,000
Jersey Central P. & L. Co.	70,917	150,000
Elizabethtown Consolidated Gas	108,831	429,000
Country Gas Co.	13,977	153,000
South Jersey Gas	52,830	414,000
Cumberland County Gas	12,029	88,000
City Gas of New Jersey	1,604	43,000
Total	1,164,759	$3,027,000

Record Year

1950 set new highs for oil industry, A.P.I. discloses

NEW YORK.—Domestic demand for petroleum products hit an all-time peak in 1950 for the eighth consecutive year, and total demand (which includes petroleum exports) resumed its upward swing to set a new high.

This was announced by Frank M. Porter, president of the American Petroleum Institute, in a year-end review of the industry's 1950 operations. The ability of the industry to meet this unprecedented demand stems from competition which spurred companies to invest $10 billion in their postwar expansion and modernization programs, Porter said.

Among the domestic records which went by the boards in the 12-month period ending December 31, 1950, were those for well completions, refinery capacity, runs to stills, and production of motor fuel, natural gas liquids, and natural gas. World production of crude oil also established an all-time high.

Production of domestic crude oil surpassed the 1949 total although falling short of the 1948 record by a small margin. Production of liquid petroleum (crude oil and natural gas liquids) passed the 2-billion barrel mark for the second time in history, topping the domestic total for 1949 although not the 1948 peak.

Domestic demand, for the third year in a row, exceeded 2 billion barrels. The 1950 domestic demand is estimated to be 2,356,000,000 bbl., an average of 6,455,000 bbl. daily. This is an increase of 11 per cent, or 663,000 bbl. daily, over 1949.

Total demand for 1950 is estimated to be 2,461,000,000 bbl., an average of 6,743,000 bbl. daily. This far outstrips the former high of 2,248,000,000 bbl., or 6,143,000 bbl. daily, set in 1948. Total demand for 1950 was about 10 per cent over the 1949 level of 2,233,000,000 bbl.

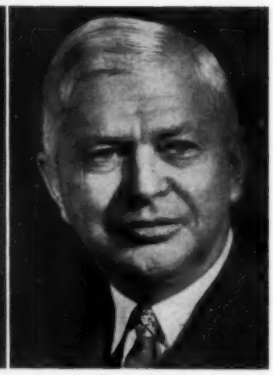
World record.—Along with the new records on the home front, a new record was established for world production of crude oil. The global total in 1950 is estimated to be 3,786,000,000 bbl., up 350,000,000 bbl. over 1948, the previous high. The major share of this increase came from wells outside the United States. Domestic crude-oil production totaled an estimated 1,973,000,000 bbl. in 1950, while crude-oil production for the rest of the world totaled an estimated 1,813,000,000 bbl. The significant fact here is that United States ranking in crude-oil production declined another two points in 1950, so that it now stands at 52 per cent of world production.

Capital investment.—Highly favorable to the consumers of petroleum products and the nation is the fact that the domestic industry continued its $2,000,000,000 per year expansion and modernization program. Capital investment in 1950 is estimated to be $2,172,000,000 The 1950 capital expenditures are only slightly under the 1948 record of $2,300,000,000. As in past years, expenditures for production operations—searching for and developing necessary oil and gas reserves and supplies—account for more than half of the 1950 outlay. Gross assets employed by the United States petroleum industry rose from $30,200,000,000 at the end of 1949 to about $32,000,000,000 at the end of 1950.

Research and prices.—Scientific progress continued its steady march in 1950. Another $100,000,000,000 was spent for research work to find new production methods and uses for petroleum and to improve known products. The wholesale price index of crude petroleum and petroleum products advanced only one percentage point in 1950, in contrast with a 4.1 point increase in the index of wholesale prices for all commodities during the same period.

J. G. PEW

J. W. NEWTON



C. E. WILSON

Spindletop Celebration

Radio programs, barbecues, and speeches will highlight observance of famous Texas field's fiftieth anniversary

BEAUMONT. — Celebration of the fiftieth anniversary of the discovery of Spindletop oil field will open here next week with elaborate ceremonies and will continue for several months.

The high point will be January 10, exactly 50 years from the day the famous Lucas gusher blew in to make Spindletop the birthplace of several large oil companies and the start of the oil industry in the Southwest.

With the slogan "Spindletop — Where Oil Became an Industry," the celebration is under the direction of a commission appointed by Gov. Allan Shivers of Texas and headed by John W. Newton, vice president of Magnolia Petroleum Co. During the opening and ensuing weeks the occasion will bring to Beaumont hundreds of oil-industry leaders, as several groups and associations have scheduled their meetings here.

The 100,000-bbl. Lucas well astonished the world, opened unlimited possibilities for production of crude, and shifted the industry's center of gravity from the East. The celebration is designed to commemorate the significance of Spindletop and its relation to the industrial achievements which followed, to pay tribute to those who participated in the development of Spindletop and the Southwest's oil industry, and to obtain general recognition of the importance of these developments to the welfare of the nation.

Official opening.—The official opening of the celebration will take place January 4, when Gulf Oil Corp.'s national broadcast will originate in Beaumont. During the following week several other nation-wide broadcasts will originate here, and there will be special meetings of oil groups, concerts, barbecues, addresses by speakers of national prominence, and many other events.

The central point of the celebration will be the "Exhibit of Progress" on the state fairgrounds which will include historical pictures and documents, dioramas, and collections of early-day tools and equipment used by the oil industry. The exhibit will be maintained intact for several months, and may be made into a permanent oil museum.

The more important events scheduled for the opening week include:

January 6. — Unveiling of a replica of the Lucas well and a complete modern power rig. Opening of the Exhibit of Progress.

January 7.—Special Spindletop radio program and broadcast of the weekly program of United States Steel Corp.

January 8. — Giant barbecue, with roughnecks and refinery workers of the area as special guests. John G. Pew, vice president of Sun Oil Co., will speak on "Fifty Years of Progress in Industrial Relations."

January 9.—The Houston Geological Society, arriving by special train, will hold a barbecue and a meeting of national interest. Speakers will include Wallace Pratt, former chief geologist of Humble Oil & Refining Co. and later vice president of Standard Oil Co. (N. J.), speaking on "Geology Then;" Alexander Deussen, famous geologist, speaking on "Geology Today;" and Ira Cram, vice president of Continental Oil Co., speaking on "Geology Tomorrow." Chairman of the meeting will be John Suman, vice president of Standard Oil Co. (N. J.).

That evening there will be a press reception and dinner, expected to be attended by some 200 newspaper, magazine, and radio writers from all over the country. This will be followed by the broadcast of the Du Pont company's "Cavalcade of America," dramatizing the Spindletop story.

January 10.—Radio broadcast by Governor Shivers, open house at various oil-industry plants, and a parade. David Rockefeller, vice president of Chase National Bank, New York, will address a luncheon given by the Rotary Club.

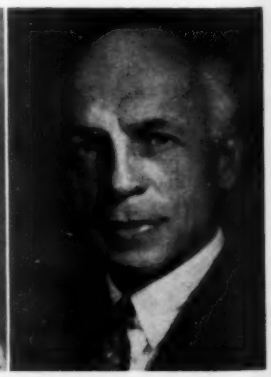
Journal Anniversary

The Spindletop discovery, which is being celebrated in Beaumont throughout the spring of 1951, was the start not only of the oil industry in the Southwest but also of The Oil and Gas Journal.

The Golden Anniversary year of the Journal will be marked by a special publication, to be distributed next May, commemorating 50 years of oil in the Southwest. It will be a comprehensive review of a half-century of progress in all divisions of the industry, a valuable reference work and also a readable history of men and events. Hundreds of companies and individuals whose histories in some cases, as in that of the Journal, date back to the Spindletop year, are cooperating in assembling the facts for this 50-year history.

B. B. JENNINGS

E. L. DeGOLYER



W. S. CARPENTER, JR.

In the afternoon there will be ceremonies at the Spindletop Monument with E. L. DeGolyer, prominent geologist, as the principal speaker. Special guests will be oldtimers of the original Spindletop days, invited by the commission from many parts of the country. Special entertainment will be provided this group, which will include Anthony Lucas, son of the Spindletop discoverer, and Patillo Higgins, who drilled the first wells in the field.

In the evening the Beaumont Chamber of Commerce will give an anniversary dinner to 2,000 invited guests. This will be followed by the main anniversary program, with entertainment by radio stars and addresses by three prominent industrialists—Walter S. Carpenter, Jr., chairman of the board of E. I. du Pont de Nemours & Co., Inc.; B. Brewster Jennings, president of Socony-Vacuum Oil Co., Inc.; and Charles E. Wilson, president of General Motors Corp.

Associations meet.—Later in the year the Spindletop anniversary will be marked by meetings of several oil-industry groups in Beaumont. Among these already scheduled are the Southwestern District of the American Petroleum Institute Division of Production, March 7-9; Texas Independent Producers and Royalty Owners Association, some time in March; National Oil Scouts and Landmen's Association, June 7-9; and Texas Mid-Continent Oil and Gas Association, October 8-9.

WEST COAST

Companies Being Sold

Negotiations under way for purchase of three California oil firms for a consideration of more than $55,000,000

D. H. Stormont

LOS ANGELES.—Sale of three California independent oil companies, involving in excess of $55,000,000, are in various stages of negotiations. Largest of the three is the sale of Jergins Oil Co., at a figure in excess of $30,000,000 to Lehman Corp. and Smith, Barney & Co. of New York.

Second deal being discussed is the purchase of Havenstrite Oil Co. by Union Oil Co. and the Nassau Co. Total involved in this deal reportedly is over $12,000,000. The third deal pending is sale of North American Consolidated Oil Co. to General American Oil Co., Dallas. Amount involved in this transaction was not stated but it is believed to be in the vicinity of $25,000,000.

Concerning the Jergins' deal, the company's president, A. T. Jergins, in an announcement last Thursday stated: "We and certain associates together representing a controlling interest in Jergins Oil Co. today agreed to sell to a responsible purchaser all of our stock holdings in the company at $421.50 a share."

The agreement to sell further provided that other stockholders were to receive the same price, and that a minimum of 46,865 of the 72,099 outstanding shares would have to be placed on deposit at an early date.

Production. — During 1949 Jergins' daily average crude production was 6,300 bbl. This year, largely because of some of its heavy-crude producers being shut in, the company's output has been lower—about 4,500 bbl. at last reports. Low-gravity production in the San Ardo field, owned 50-50 by Jergins and North American Consolidated, remains closed in.

The Jergins company got its start in Signal Hill field in California in the 20's. Its present largest oil reserve is in Edison field in California. Other principal producing properties are in Wilmington and Signal Hill fields.

Other oil properties include acreage in Texas.

Havenstrite deal. — The Union-Havenstrite deal, which is expected to be closed by the first of the year, involves Union purchasing the large Havenstrite natural-gasoline plant in the Del Valle field. Nassau Co. would buy the company's producing properties, which have a current daily output of about 3,000 bbl. Consideration for the plant has been placed at about $3,500,000 while that of the production was reported at $8,500,000.

About this time a year ago Nassau Co. purchased the Dohney interests in the Coalinga Nose field of Kern County and then made a long-term deal with Union to purchase the crude. It is generally believed that should the Havenstrite purchase be carried out a similar arrangement would be made.

Latest development concerning North American Consolidated, which is now headed by Tevis F. Morrow of Los Angeles following his recent purchase of most of the outstanding stock, is that the board of directors has authorized its sale to General American. Amount of daily crude production involved in this sale is around 5,500 bbl. *(The Oil and Gas Journal, November 30, 1950, page 44, and December 14, 1950, page 62.)*

Climbing Production

California's December oil output may set new record

LOS ANGELES.—With an output of 960,000 bbl. daily, California oil fields last month set a new record high production. This month it appears that the state's daily output will be still higher. Despite these record rates of production, however, the West Coast and foreign demand is barely being met.

This situation principally was brought about by increased military demands. California, which accounts for only about 16 per cent of the nation's crude production, is supplying over 56 per cent of this enlarged demand. Currently about 125,000 bbl. daily is being shipped the military. Only last June 87,000 bbl. was all that was required of the state's daily output.

Tight market.—Tightness of the West Coast crude market is reflected in two recent announcements of Standard Oil Co. of California. One was that because of its inability to secure sufficient light crude oil in California, it was going to start bringing in a "limited amount" of crude from Borneo. *(The Oil and Gas Journal, December 14, 1950, page 62.)*

The second was Socal's announcement last week that it was increasing its posted prices for heavy crudes to conform, more or less, with an advance made by Union Oil Co. in October. It went a step further, however, and increased its prices for all gravities above 26° by 3 or 4 cents. For 14°-gravity crude the advance was 25 cents per barrel, with a declining differential that led to about 12 cents more for 20°-20.9° grade. The increases for light-gravity crudes were the first posted since before an over-production of heavy crude caused a break in the market in early 1949.

November increase. — November's daily output of 960,000 bbl. represented an increase of around 110,000 bbl. over the low level of early summer. Most of this higher production came from wells which had been closed for 9 months to 1½ years because of excess heavy crude oil. Of the remainder, about 26,000 bbl., new production at Wilmington, South Cuyama, and Ventura Avenue fields made up the bulk.

Because of the high rate of production, total stocks of crude and refined products increased about 1,500,000 bbl. during November. Except for October, when they gained around 600,000 bbl., total stocks had been in a constant decline all this year. On November 31 they were approximately 96,700,000 bbl., or about 35,000,000 bbl. less than at the same time a year ago.

SOUTHWEST

Texas Production

Commissioner predicts it will set record in 1951

Joseph A. Kornfeld

AUSTIN. — A record crude-oil-production volume for the State of Texas for 1951 was forecast last week by W. J. Murray, Jr., chairman of the Texas Railroad Commission.

"In 1951, we will be able to produce, and probably will produce, more oil than ever before in history," Murray said, adding that this condition would be "largely attributable to the all-time record rates of exploration and development in 1949 and 1950."

"The possibility exists," the commissioner explained, "that curtailment of essential oil-field materials, particularly steel tubular goods, during 1951, will retard development and thus inevitably result in lessened producing ability during subsequent years."

Murray feared such a situation might develop at a time when the security of the United States would demand maximum domestic production exceeding that of any previous emergency.

"It is therefore imperative that the petroleum industry be diligent to assure the maximum development of additional reserves with a minimum expenditure of critical materials," he said.

Gas conservation.—Progress in conservation of gas produced with oil was shown in a report by Murray that only 0.6 of 1 per cent of all casing-head gas is now flared. The total 1950 casing-head-gas production averaged 3,000,000 M.c.f. per day. He contrasted this current condition with the 1945 status when flaring destroyed 27 per cent of the 1,250,000 M.c.f. daily output of oil-well gas.

During 1950, production of natural gas reached an all-time high of 3,913,000,000 M.c.f. This represents 500,000,000 M.c.f. more than was produced during 1949. There are 11,127 gas wells in Texas but only 7,117 are listed as producers. This compared with 10,239 gas wells including 6,381 producers as of 1949.

Extracted from natural gas during 1950 in Texas were 112,000,000 bbl. of liquids such as natural gasoline, butane, and propane, a gain of 22,000,000 bbl. over 1949.

During the current year, the number of gasoline plants in operation rose from 151 to 176. Cycling systems increased from 35 to 36, although pressure-maintenance projects dropped from 149 to 148.

Carbon black production from Texas gas amounted to 666,784,253 lb. from 37 plants during 1950 as compared with 710,393,390 lb. produced from 41 plants during 1949.

Crude-oil output.—Total crude-oil production for Texas this year was estimated by Murray at 852,000,000 bbl., up 164,000,000 bbl. over 1949. However, the 1950 estimate fell 46,000,000 bbl. below the 1948 figure.

Total production of other petroleum liquids brought the 1950 figure of total crude and liquid-hydrocarbon output to 946,000,000 bbl., approximately 13,000,000 bbl. below the peak output reached in 1948.

The number of new oil discoveries made during 1950 was set at a new peak of 562, up from 478 in 1949, the commissioner said. New gas-field discoveries were put at 76, down from 98 last year.

A total of 3,080 "wildcat" wells were drilled this year, a gain of 450 over last year.

Development brought the net number of producing oil wells during the year to 125,165, up 8,000 since 1949.

However, the number of "dusters" reached a new high in Texas. This year 4,597 dry holes were drilled, compared with 3,935 last year.

Using estimated figures for the last week of 1950, Murray submitted these comparisons with the year 1949 as follows:

	1950	1949
Oil fields discovered	562	478
Gas fields discovered	76	98
Oil well completions	10,661	8,911
Gas well completions	741	712
Dry holes	4,597	3,935
Drilling applications	19,418	16,763
Wells plugged	6,979	5,826

Order Upheld

Col-Tex must buy oil from fields ratably, court says

AUSTIN. — A Railroad Commission order requiring the Col-Tex Refining Co. to purchase crude oil ratably in eight West Texas fields was declared valid by the Third Court of Appeals last week.

In a reversal of a trial-court judgment which had enjoined the commission from enforcing its order, the appeals court said that the state's "common-purchaser" law was applicable to Col-Tex. This statute requires companies to buy ratably from fields in which it is a common purchaser.

Earlier, Col-Tex had scored a victory in trial court on its argument that it was not a common purchaser in the Sharon Ridge 1,700-ft. and 2,400-ft. reservoirs. During 1949, it purchased 100 per cent of the allowable production in these two zones through a contract with Coffield & Guthrie, Inc., a crude-oil gatherer.

Col-Tex argued that it should not be considered a common purchaser in those areas since it purchases no oil from producers in the two reservoirs and that its pipe line does not enter those two fields.

Court erred.—In writing the appeals court opinion, Associate Justice Hughes said: "We are clearly of the opinion that the trial court erred in construing (the law) as not prohibiting inter-field discrimination. . . .

"There can be no question but that the primary purpose of the legislature in enacting the common-purchaser statute was to prevent proration of petroleum production, the inevitable result of which is, as exemplified by this record, that a few are favored at the expense of (the) many."

Compliance ordered. — Col-Tex had taken less than the allowable production in a group of six fields other than Sharon Ridge in 1949 and protests of royalty owners and producers in the "slighted fields" led to the commission order, the court noted.

The court said that Col-Tex must obey the commission's directive to purchase ratably from the two Sharon Ridge oil reservoirs as well as the Howard-Glasscock, Iatan-East Howard, Iatan-North Howard, Snyder, and Westbrook fields.

Louisiana Allowable Up

BATON ROUGE.—Louisiana will start the new year with a daily crude allowable which is 57,539 bbl. higher than for January 1950.

Conservation Commissioner S. L. Digby has set the January allowable at 629,751 bbl. for the state. This is a slight increase over the December figure of 621,710 bbl. Digby says that most of the increase is due to increased market demand as reflected by nominations at the state-wide allowable hearing earlier in December.

November oil activities, the Louisiana department records show, took a normal seasonal drop. Drilling permits dropped to 207 from 243 in October, and completions from 223 to 200. Of the November completions, 90 were oil wells, 30 made gas, and the remainder were unproductive. As December began, there were 318 rigs active over the state.

GULF COAST

Tidelands Fight Renewed

AUSTIN.—A strong fight for congressional approval of state ownership of submerged areas is due to be renewed by the Texas delegation when Congress resumes sessions after the Christmas holidays. Meanwhile, Texas state officials are licking their wounds after the Supreme Court decision granting federal ownership to all territory lying beyond low tide.

Last week three questions arose in the tidelands oil dispute, all related to the matter of lease rentals.

Att. Gen. Price Daniel asked the Texas Supreme Court to reconsider its December 6 decision that the School Land Board must return

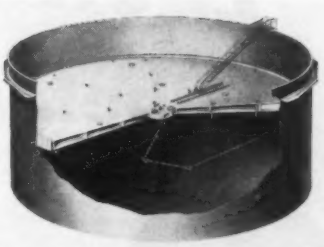
Despite burning heat . . . these tanks protect volatile crude components

It can get pretty warm at the Midway Station of the Texas Company's Valley Pipe Line in McKittrick, Calif., for summer temperatures often exceed 100 degrees.

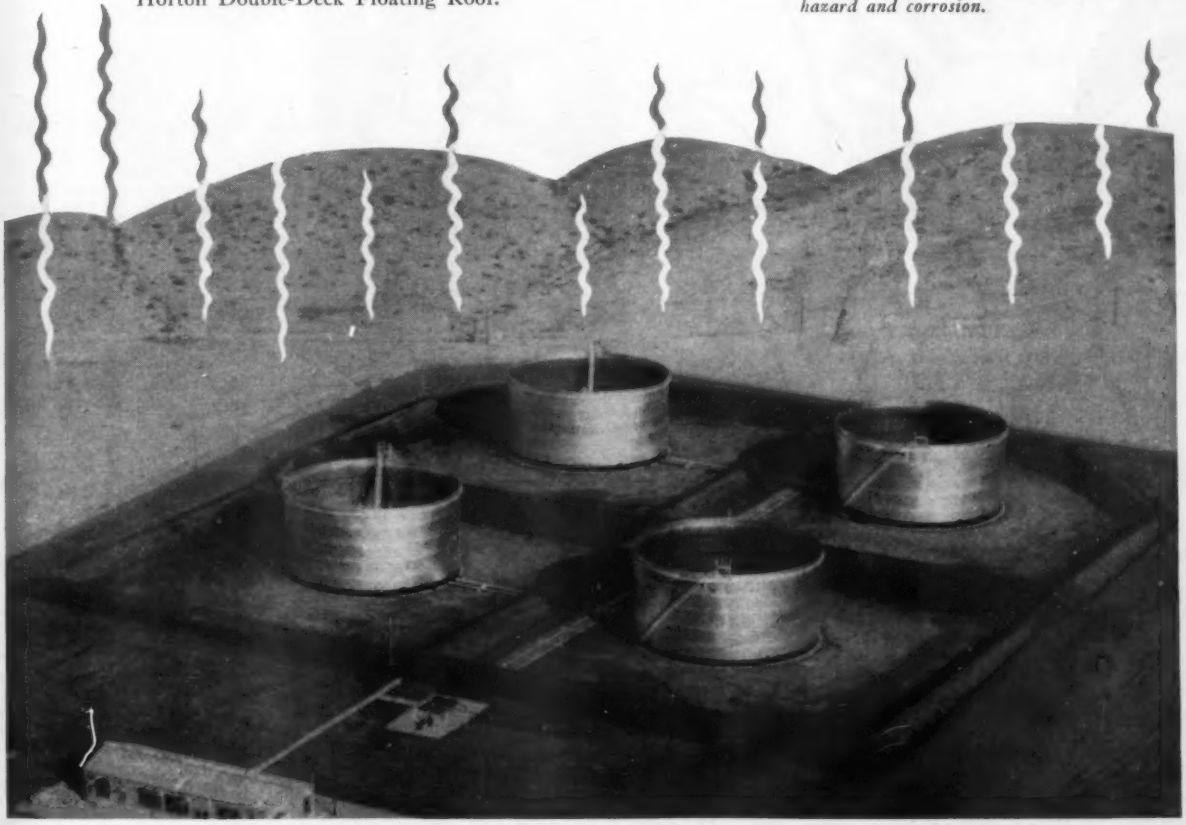
If conventional cone-roof tanks were used to handle crude oil at Midway Station the light fractions would vaporize and be lost. This would mean more than just a decrease in the quantity of crude. The quality of the crude would also be affected for an evaporation loss of 1.0 per cent is accompanied by a drop in gravity of about 0.4 degrees API.

But volatile crude components *are not* lost at the Midway Station, because each of the 35,000-bbl. tanks shown below is equipped with a Horton Double-Deck Floating Roof. This efficient roof floats directly on the liquid and so eliminates the vapor space in a tank. It thereby eliminates filling evaporation losses and reduces breathing losses. The double-deck construction provides insulation that cuts down boiling losses.

Write for Bulletin B for full details about the efficient Horton Double-Deck Floating Roof.



Cutaway view showing construction of a Horton Double-Deck Floating Roof. It illustrates how the roof floats on the liquid and eliminates the vapor space present in fixed-roof tanks. By eliminating the vapor-space, the Horton Double-Deck protects volatile components from evaporation—and also reduces the fire hazard and corrosion.



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Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 17.....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3.....1615—1700 Walnut Street Bldg.
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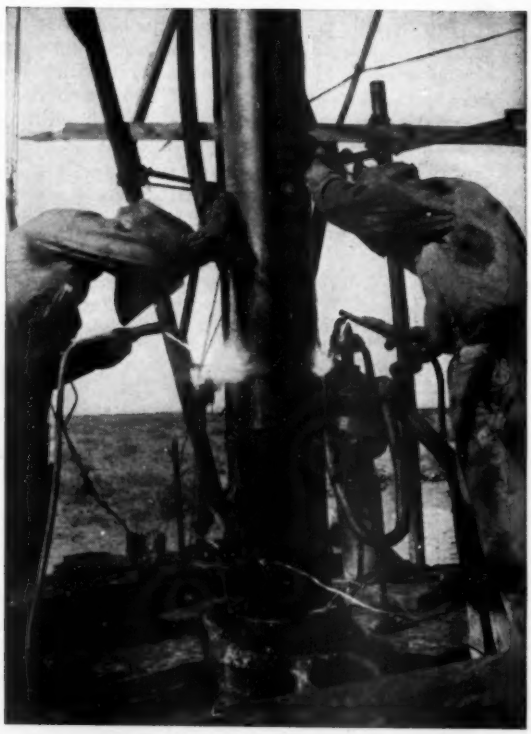

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$123,360 paid on tideland leases last year by Melben Oil Co. and Ohio Oil Co. In addition $315,000 is being kept in a state treasury suspense account for lease rentals paid by other companies on the basis of $1 per year per acre. This includes $40,800 for 1950 tideland lease rentals paid before December 6 by Brazos Oil & Gas Co., Superior Oil Co., Phillips Petroleum Co., Oil Drilling Co., Inc., and Sun Oil Co.

Checks totaling $229,000 paid after December 6 to the state were returned by Land Commissioner Bascom Giles to four Texas companies. These payments, made under protest, were submitted by Stanolind Oil & Gas Co., Humble Oil & Refining Co., Ohio Oil Co., and Texas Eastern Production Corp. Since the United States Supreme Court held the state can retain all income received before June 5, 1950, Daniel asked the Texas Supreme Court whether the state can keep lease rent money paid under protest in 1949.

A question of future administration also arose since no federal agency has been established to manage the tidelands areas. Since June 5, 1950, the income amounts to $17,200.

Underground L.P.G. Storage

CORPUS CHRISTI.—The Texas Railroad Commission has granted permission to Southern Minerals Corp. for an underground-storage project for liquefied petroleum gases in the Stratton field of Nueces County.

Southern will return L.P.G. into the 6,500-ft. Sellers reservoir a Vicksburg (Oligocene) sand, which underlies Southern's Sellers lease. The action was based on evidence received May 31 by the commission at a formal hearing on the request of the company. It was found that of an estimated 200,000 bbl. of oil in place, only 50,000 bbl. was found to be recoverable. The Sellers reservoir was abandoned in 1948.

After authorizing use of 5 Sellers for injection, the commission then designated the 67-acre area as the Stratton (Sellers L.P.G.) field comprising wells Nos. 1, 3, and 5 Sellers. A net gas-oil ratio for the new field was ordered establishing a limit of 785 cu. ft. per barrel on a net basis and granting credit for produced gas diverted to legal uses.

It was reported that initial injection volumes will average 3,500 gal. per day of commercial propane and butane. These surplus products are obtained from the high-pressure absorption-type natural-gasoline plants of Southern Minerals located in Nueces County. It is anticipated that well-head-injection pressures will average 1,350 psig. initially. However, it is also expected that the pressure at the sand face will be kept below the initial observed bottom-hole pressure of 2,800 psig.

CANADA

Plant on Stream

New Shell facilities at Montreal now operating

MONTREAL.—Following final completion of an extensive modernization and expansion program, full operation is now under way at the Montreal East refinery of Shell Oil Co. of Canada, Ltd. The refinery has been expanded in crude-charging capacity from 14,000 to 25,000 bbl. per day, and operations have been modernized by the addition of vacuum distillation, fluid catalytic cracking, and catalytic polymerization facilities.

Two existing crude units were revamped for expanded operation and a World War II alkylation plant was converted to increase crude distillation capacity. Thermal cracking facilities were also modified to conform to the modernized, expanded operation.

A new 12,000 bbl. per day vacuum distillation unit will fractionate topped crude into a vacuum distillate feed stock for fluid catalytic cracking, and a heavy tar-bottoms fraction which will be utilized as plant fuel. The new fluid cat cracker has a rated feed capacity for 10,000 bbl. per day. Of Shell design, it incorporates several new design features not previously employed in units of that type. It comprises conventional light-ends-recovery facilities.

Unit revamped. — An existing polymerization unit has been revamped and new polymerization capacity has been added to maximize production of high-octane gasoline in the new refinery. Another innovation at the refinery is the use of in-the-line blending of gasoline components, which reduces the cost of storage installations and minimizes vapor losses.

The construction program also included the addition of 750,000 bbl. of crude and product storage, new water-cooling towers, steam-generating capacity, workshops, and other maintenance facilities. A new laboratory was completed a year ago as part of the modernization program.

Arthur G. McKee & Co., Cleveland, contracted for the construction of the fluid catalytic cracking unit, the vacuum unit, and light-ends-recovery facilities. Erection of auxiliary units and revamping of existing process units was contracted to Fluor Corp. A solutizer treating unit was installed by Shell personnel.

No Competition With U. S.

Alberta crude oil, now beginning to move eastward toward Ontario refineries, cannot compete with United States crude now being used by these refineries unless its field price is reduced about 50 cents per barrel, it is concluded in a study just completed by a large Mid-Continent producer.

The Interprovincial pipe line from Alberta to Superior, Wis., is now in operation and crude is being stored at Superior for shipment to refineries at Sarnia and Toronto, Ont., by lake tanker when the navigation season opens in the spring. These Ontario refineries are now using United States crude supplied by pipe lines at delivered costs of about $3.20 or $3.25 per barrel in United States currency.

The pipe-line tariff from Edmonton to Superior is 51 cents per barrel, and lake transportation from Superior to Ontario will range from 14 to 28 cents per barrel, depending on the type of tanker used. No duty is involved, since the Canadian crude is reexported from the United States after being stored in transit.

Representative prices posted for Alberta crude by Imperial Oil, Ltd., are $3.05 per barrel in Leduc, $3.03 in Golden Spike, and $2.73 in Redwater (Canadian dollars). Adding these costs to the transportation charges indicates that Alberta crude delivered in Ontario will be 40 to 55 cents per barrel above United States crude at current prices.

Exploration Program Set

An agreement on a joint-exploration program in an area of about 900 sq. miles in the vicinity of Edmonton, Alta., has been reached between Sinclair Canada Oil Co. and British American Oil Co., Ltd.

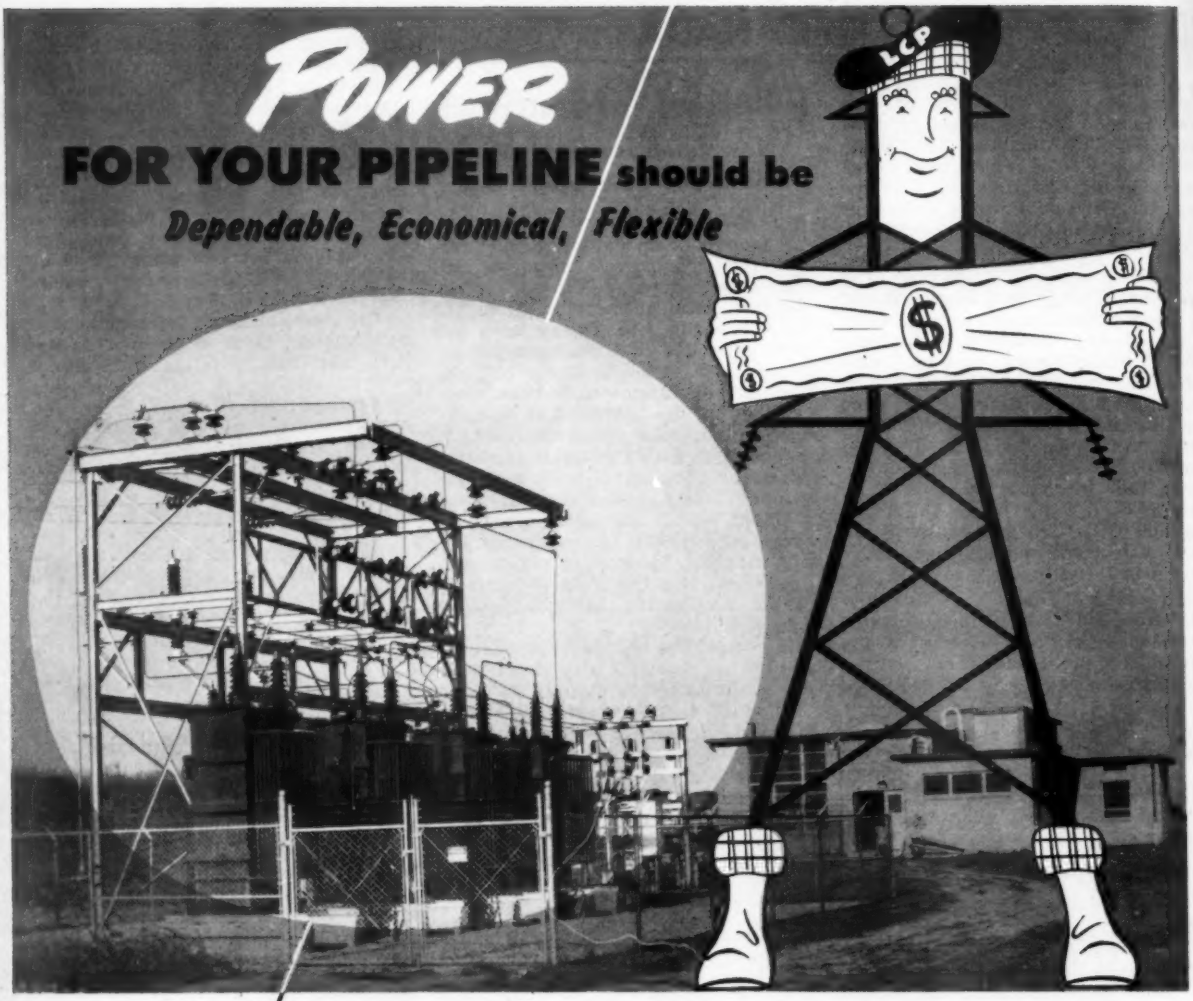
As an initial step in the program, two seismograph crews have been placed in the field under the joint direction of the two companies which share equally in the expenses of the operations.

MID-CONTINENT

Soldiers 'Lifted' Home

TULSA.—The miniature "Operation Berlin" staged by 15 Tulsa oil companies over the Christman holidays left more than 100 G. I. members of the Forty-Fifth Division feeling pretty grateful. The companies donated 16 planes to the "airlift" from Camp Polk, La., to Tulsa, and thereby enabled the Thunderbirds to spend 12 hours longer at home. In addition, the men were supplied with food, soft drinks, and cigarette lighters for Christmas presents, as well as return-trip tickets to Camp Polk.

Companies who donated planes were: British-American Oil Producing Co., Carter Oil Co., Gulf Oil Corp., Loffland Brothers Co., Noble Drilling Co., Phillips Petroleum Co., Bartlesville, Okla.; Service Pipe Line Co., Stanolind Oil & Gas Co., Sunray Oil Corp., Tulsair Distributors Sales & Service, Warren Petroleum Corp., Williams Brothers Corp., and Century Geophysical Co.



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World Production Up

October's high level established sixth consecutive record, with a total output of 11,190,000 bbl. daily

Dahl M. Duff

WORLD production of crude oil continued at its high level through October, establishing a sixth consecutive record with a total output of 11,190,000 bbl. daily.

The gain over September of approximately 120,000 bbl. daily was an increase of 1.1 per cent and was entirely due to a further rise in production outside the United States. Most of this occurred in the Middle East which showed an increase of 5 per cent over the previous month.

United States crude production, which has been expanding steadily since the early part of the year, dropped back slightly during October. The month's estimated output was about 9,000 bbl. daily under the record high total of 5,887,900 bbl. daily in September.

Total foreign production, including estimated Russia and Eastern Europe, was up nearly 130,000 bbl. daily during October. This represented a 2.5 per cent gain. Exclusive of the communist production, the increase over September was 3.0 per cent. Production in the Western Hemisphere, other than in the United States, was up slightly less than 2 per cent.

All-time records.—A number of individual countries established all-time high-production records in October. For the second time in the petroleum history of the Middle East, output in Saudi Arabia exceeded that of Iran and took the leading position in the Persian Gulf area. Kuwait, Colombia, Venezuela, Iraq, and Germany, as well as Saudi Arabia, all set new records in crude production.

The remarkable expansion of crude production that has taken place this year becomes more apparent when the figures for October are compared with those for the same month of 1949. Total world production is now more than 18 per cent above last year. In the United States, the gain amounts to 17.7 per cent; the foreign production total is up 18.8 per cent.

The sharpest increase of all has occurred in the Middle East. October production in this region was more than 30 per cent above October 1949, with Kuwait alone showing a gain of 48 per cent. Foreign production in the Western Hemisphere has shown a smaller but still outstanding increase of nearly 14 per cent.

Venezuela.—Production in Venezuela during October exceeded the 1,600,000-bbl. daily mark for the first time. The daily average during the month of 1,611,500 bbl. was an increase of 25,500 bbl. daily over September. Of the October production, 1,132,900 bbl. daily came from Western Venezuela, and 478,600 bbl. daily from Eastern Venezuela. Venezuelan production for the first 10 months of this year now averages 1,474,065 bbl. daily, compared to the 1949 average of 1,321,367 bbl. daily.

Weekly production figures in Venezuela showed the following: week ended October 9, 1,614,800 bbl. daily; October 16, 1,597,800 bbl. daily; Octo-

WORLD CRUDE-OIL PRODUCTION
(Thousands of barrels daily)

Country—	Oct. 1950	Sept. 1950	Oct. 1949
Western Hemisphere:			
Argentina	65.0	65.2	63.2
Bolivia	1.7	1.7	2.2
Brazil	0.8	1.5	0.2
Canada	88.0	89.9	65.0
Chile	1.8	1.5	0.5
Colombia	98.5	97.9	78.9
Cuba	0.3	0.3	0.6
Ecuador	7.1	7.1	7.1
Mexico	213.0	199.0	173.4
Peru	41.0	41.0	40.6
Trinidad	56.0	55.0	57.4
Venezuela	1,611.5	1,586.0	1,431.0
Total	2,184.7	2,146.1	1,920.1
Europe and Africa:			
France	4.2	3.2	1.3
French Morocco	0.9	0.9	0.4
Germany	22.9	22.5	17.8
Italy	0.2	0.2	0.2
Netherlands	12.4	13.5	12.1
Egypt	46.1	45.2	47.5
United Kingdom	0.9	0.9	0.9
Total	87.6	86.4	80.2
Middle East:			
Bahrein	29.8	31.1	30.0
Iran	625.3	611.0	543.6
Iraq	167.6	160.8	106.4
Kuwait	387.4	368.8	261.7
Qatar	39.2	36.4	.....
Saudi Arabia	643.1	594.8	486.9
Turkey	0.8	0.8	0.6
Total	1,893.2	1,803.7	1,429.2
Other Asia:			
British Borneo	88.0	88.0	74.5
Burma	1.8	1.8	0.6
China	2.0	2.0	1.5
India	5.2	5.2	5.3
Indonesia	150.0	150.0	116.0
Japan	5.0	5.1	4.4
New Guinea	4.8	4.8	4.8
Pakistan	4.0	4.0	2.8
Total	260.8	260.9	209.9
Total, foreign less Russia and E. Europe	4,426.3	4,297.1	3,639.4
Estimated Russia and Eastern Europe:			
Austria	25.0	25.0	20.0
Romania	85.0	85.0	90.0
Russia	750.0	750.0	700.0
Other E. Europe	24.6	24.6	19.0
Total	884.6	884.6	829.0
Total, foreign	5,310.9	5,181.7	4,468.4
United States	5,879.0	5,887.9	4,997.0
World total	11,189.9	11,069.6	9,465.4

Figures are from reliable reports in the industry or from official government sources. Data for Russia and eastern Europe are based on competent estimates; no authentic information is available on production in these areas.

ber 23, 1,613,300 bbl. daily, and October 30, 1,620,000 bbl. daily. Production by companies during October was as follows (figures are in barrels daily showing lease production as compiled by the Oficina Tecnica de Hidrocarburos of the Ministerio de Fomento):

Creole	739,501
Shell	489,137
Mene Grande	229,113
Socony-Vacuum	41,964
Texas	25,160
Atlantic	18,830
Mercedes	19,461
Sinclair	11,553
Pantepec	11,669
Richmond	16,840
Phillips	7,344
B.C.O.	945
Orinoco	25

Mexico.—Mexican production continues to show results of development efforts of Petroleos Mexicanos and foreign contractors. October output was estimated at 213,000 bbl. daily. A recent statement of the government oil organization said third-quarter production of this year would total 18,718,832 bbl. (204,000 bbl. daily) as against 15,662,377 bbl. (170,000 bbl. daily) in the corresponding quarter of 1949. Mexican officials had hoped to enlarge their production to 250,000 bbl. daily by the end of the year. Sen. Antonio J. Bermudez, Pemex director-general, said this year's output will total at least 72,000,000 bbl. (about 198,000 bbl. daily), and greatly exceeds every other year except for the period from 1919 through 1926.

Colombia.—Crude production in Colombia showed another slight gain in October to reach 98,500 bbl. daily. The gain over last year is largely due to the increased capacity of the Andian National pipe line which moves De Mares and Casabe crude. During October, pipe-line deliveries to the Andian line amounted to 60,806 bbl. daily, and to the South American Gulf line, which transports Barco crude, to 26,137 bbl. daily. Runs to stills in the Barranca refinery averaged 22,904 bbl. daily during the month. Production by concessions in Colombia during October was: De Mares, 36,759 bbl. daily; Barco 27,024 bbl. daily; Yondo, 29,843 bbl. daily; Cantagallo, 1,203 bbl. daily; Dificil, 2,691 bbl. daily; and Velasquez, 1,084 bbl. daily.

Western Europe.—In Western Europe, crude production in Western Germany for the first time since the end of the war exceeded 100,000 metric tons. The total of 100,448 tons was equivalent to about 22,900 bbl. daily. Included was 43,403 tons from Emsland, 46,722 tons from Hanover, 9,836 tons from Schleswig - Holstein - Hamburg, and 487 tons from Baden.

Another marked gain was reported in crude production in France. The month's total was above 4,000 bbl. daily. The rise in production in metropolitan France is due to development of the new Lacq field near the Pyrenees. Slightly more than 1,000 bbl. daily continues to come from the old Pechelbronn field.

Middle East. — Preparations for the Trans-Arabian pipe line accounted for a part of the increase in output in Saudi Arabia during October. The month's production of 643,100 bbl. daily was an increase of more than 48,000 bbl. daily, or 8.1 per cent, over September. The October production compared with the 625,300 bbl. daily output in Iran, normally the major producing country in the Middle East. Production in Saudi Arabia in October was 32.1 per cent above October 1949.

The high rate of deliveries through the 12-in. and the newer 16-in. pipe lines to Tripoli brought an increase in total production in Iraq to about 168,000 bbl. daily. All but about 8,200 bbl. daily of this comes from Kirkuk and is limited by the capacity of the existing lines. A several-fold increase in Iraq production will be made possible by the completion of the new 30-in. on which construction is about to start.

Another increase in production was reported in Kuwait. The 387,400 bbl. daily total was 5 per cent above the previous month.

Production of crude in Kuwait did not begin on a commercial basis until about 3 years ago. The enormous potential of the single Burghan field is indicated by the fact that, during this relatively short period, the shiekhdom has risen to the position of the sixth largest producing country in the world.

TREND OVER THE LAST YEAR

	Western Hemisphere less United States	Middle East	Total foreign less Russia & E. Europe
1949—			
November	1,925.9	1,472.7	3,683.0
December	1,929.3	1,489.6	3,711.0
1950—			
January	1,946.5	1,491.4	3,733.4
February	1,820.6	1,566.6	3,689.4
March	1,900.4	1,607.4	3,812.9
April	1,968.2	1,639.5	3,918.2
May	1,775.4	1,752.0	3,847.4
June	2,098.2	1,811.5	4,229.6
July	2,073.2	1,808.3	4,202.6
August	2,097.8	1,839.5	4,273.6
September	2,146.1	1,803.7	4,297.1
October	2,184.7	1,893.2	4,426.3

EUROPE

British Aid Ends

Marshall-plan help to be suspended on December 31

MARSHALL-PLAN aid to the United Kingdom will be suspended December 31, probably for the duration of our defense program, it was announced last week by the Economic Cooperation Administration in Washington.

A few programs will be continued through the early months of 1951, however, including one involving several million dollars worth of specialty oil products for which Britain is dependent upon dollar sources, to be paid for out of funds already allocated. In addition, it is expected that Britain will receive supplies of such items as aviation gasoline and aviation lubicants for which she is dependent on this country, under the Mutual Defense Assistance program.

Basis for the suspension of European Recovery Program assistance, on which agreement was reached by American and British officials in 5 weeks of discussions, is the economic recovery of Britain and the sterling area as a whole which has wiped out the dollar deficit which made the Marshall plan necessary in the first place.

Defense demands.—At the same time, ECA officials said, our defense program now is imposing new and heavier demands on our own economy which make a review of ERP requirements desirable.

During the 33 months in which Britain participated in the European Recovery Program she was allotted a total of $2,694,300,000, of which, up to September 30, last, $295,300,000 was for petroleum and products. The ERP still has 15 months to run. A considerable amount of the funds allocated up to the end of this year will remain available for such few programs as will be continued, but the whole transaction is expected to be wound up by the end of next June.

U. K. position.—The United Kingdom now is held to be in a position where she can secure most of her oil requirements from nondollar sources and provide exchange for purchase of the balance from dollar countries. Refinery expansion now under way and agreements entered into with American companies earlier this year are expected to take care of the oil situation.

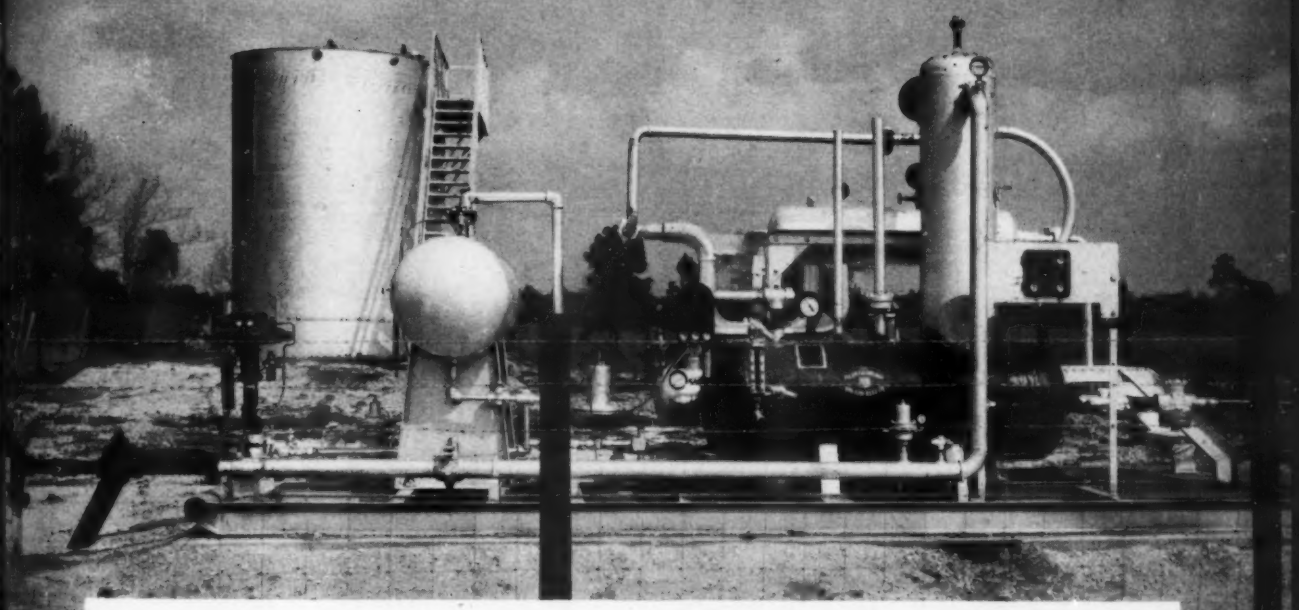
ECA officials emphasized that the agreement just entered into calls for suspension and not termination of Marshall-plan aid and in the event Britain suffers an economic setback it can be resumed.

"The suspension of aid under the European Recovery Program does not mean that the recovery of the British economy is complete or that the financial resources of the sterling area are adequate," it was explained. "Both governments recognize that part of the improvement in the position of the sterling area is to be ascribed to external factors which may well be temporary. Furthermore, new difficulties and burdens are certain to fall upon the British economy and balance of payments in 1951 as a result of the increased defense program.

(Other International News will be found on pages 117, 128, and 129.)

PARKERSBURG HYRECO PROCESSING UNIT
VS
CONVENTIONAL HEATER-SEPARATOR HOOK-UP

HYRECO RECOVERS 21% MORE CONDENSATE



Data provided by this direct test of the old versus the new in condensate recovery methods further substantiates the revenue-increasing performance of the Parkersburg Hyreco Processing Unit. Tests were made under identical operating conditions on the same well, by alternately flowing it through the Hyreco and then through the heater-separator hook-up.

When flowing through conventional hook-up stock tank condensate recovered was 30.9 bbls. per mmcf of flow with separator pressure at 600 psi and temperature at 67 deg. F.

When flowed through the HYRECO, stock tank condensate recovery jumped to 37.4 bbls. per mmcf of flow with high recovery separator pressure at 600 psi and temperature at 16 deg. F.

The Parkersburg Hyreco Well Head Processing Unit is a revenue producing investment, that pays out quickly and produces extra profits every day it is in operation. It will pay you to get the facts about Hyreco . . . ask your Parkersburg Representative or write for bulletins.

THE PARKERSBURG RIG AND REEL COMPANY, Parkersburg, West Va.

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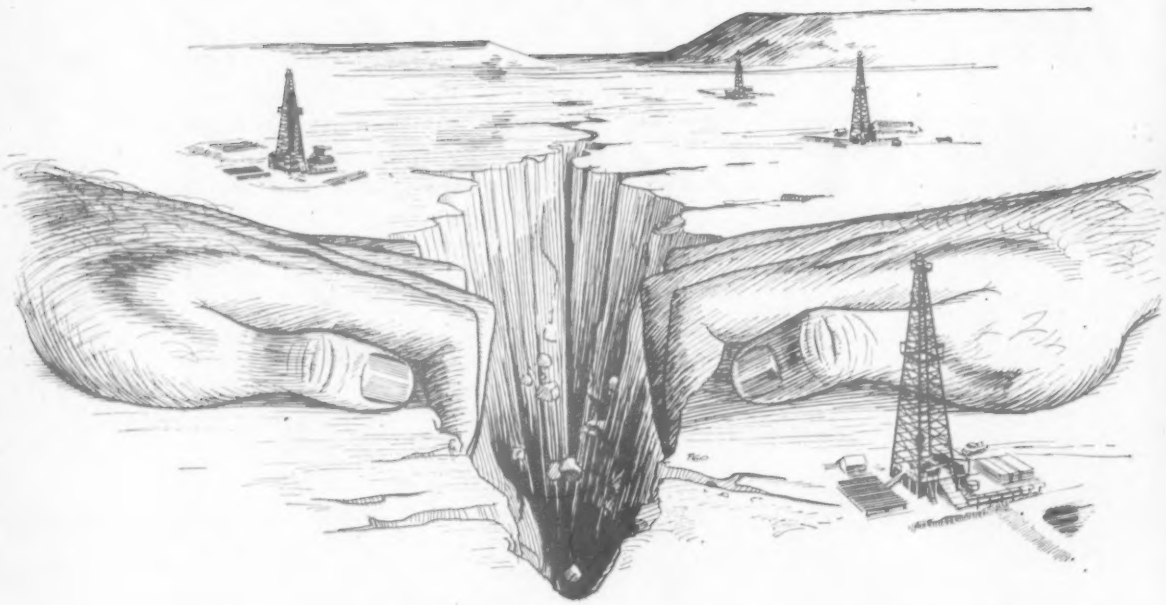
PRESSURE EQUIPMENT

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • HYDRACEPTER • SCRUBBERS • TREATERS • HEATERS

Manufactured in Houston, Texas

let CORE LAB look for you!



First for fifteen years – in the advancement of petroleum reservoir engineering – *and still growing,* Core Lab *knows how* to "look" at a reservoir in order to establish and maintain properly engineered control over drilling and completion operations and to inaugurate field production practices designed for maximum recovery.

Personnel available for these services includes over *one-hundred and fifty* petroleum, geological, mechanical, and chemical engineers.

Current facilities include: *eighteen* base points and stationary laboratories fully equipped to perform off-location analysis of conventional, large, and side-wall cores; *twenty-three* mobile field labs equipped for derrick-side well logging – in combination with on-location core analysis; *eleven* mobile field labs equipped for on-location core analysis; over *one-hundred and sixty* special Core Lab Freeze Boxes for quick-freezing samples for off-location analysis with on-location results; "suitcase" and "doghouse" type labs specially designed for use on off-shore locations; and a complete bottom-hole department adequately equipped and staffed to perform comprehensive Reservoir Fluid Analysis service.

All this proves up one important fact – that from Core Lab, you can select any type of petroleum reservoir engineering service needed, and be assured that the work will be accomplished in a reliable and accurate manner.

CORE LABORATORIES, INC. ● DALLAS, TEXAS

DALLAS HOUSTON CORPUS CHRISTI SHREVEPORT ELDORADO TYLER LAFAYETTE NATCHEZ SAN ANTONIO OKLAHOMA CITY DENVER MIDLAND ABILENE RANGELY WORLAND BAKERSFIELD CANADA VENEZUELA

"From discovery to maximum recovery."

CORE LAB

PETROLEUM RESERVOIR ENGINEERING

PERSONALS

Steps Up

Love named manager of Shell's Houston refinery

M. P. L. LOVE, manager of Shell Oil Co.'s manufacturing-research department in New York, has been appointed manager of Shell's Houston refinery to succeed P. E. Foster, who is retiring after 35 years with the firm.

A native of Florence, Miss., Love joined Shell in 1927 as a junior chemist in the company's refinery at Wood River, Ill. He resigned the same year to complete his studies at Mississippi College, from which he was graduated in 1928 with a B.A. degree in chemistry. He also took graduate work in organic and industrial chemistry at the University of Virginia.

In 1935 Love returned to Shell as a chemist at Wood River. During the next 8 years, he held several positions of increasing responsibility, including chief research chemist at the Houston laboratories in 1942, and research director at Wood River in 1943. In 1948 he was transferred to the company's New York head office as research-department manager, directing all manufacturing-research programs in the company's territory east of the Rocky Mountains.

Thomas E. Matson, district geologist for Pure Oil Co. at Ardmore, Okla., has been transferred to Tulsa as division geologist.

Vern Taylor, with Imperial Oil Co. since 1930, has been appointed management assistant of the western producing division, succeeding **E. D. Wilson,** who has been transferred to Toronto as operations adviser with the eastern producing department. Taylor joined Royalite Oil Co. in 1937 as production superintendent, rejoined Imperial in 1946, and has been division petroleum engineer since 1948.

George W. Eaton, Jr., junior petroleum engineer for Stanolind Oil & Gas Co., has been transferred from Longview to Abilene, Tex.

Lee E. McDuff, division engineer for Transcontinental Gas Pipe Line Corp. at Laurel, Miss., has been transferred to Eunice, La.

J. A. Jorgenson, formerly district geologist for Union Oil Co. of California, has joined Intex Oil Co. in West Texas and Southeast New Mexico as district geologist. He will headquarter in Midland, Tex.

William P. Castleman, Jr., and **Joseph I. O'Neill, Jr.,** have dissolved their partnership in Midland, Tex., and will operate independently. O'Neill will maintain his office in Midland, and Castleman will open an office in Dallas.

Frank R. Field, of Esso Standard Oil Co., has been elected chairman of the executive committee by the board of directors of the Asphalt Institute, and **Bernard E. Gray** has been re-elected president. The executive committee will also include: **Inghram Grayson,** Lion Oil Co., retiring chairman, and the five newly elected vice presidents: **L. P. Street,** American Bitumuls Co.; **Lysle W. Walker,** Leonard Refineries, Inc.; **C. E. Cox,** Carter Oil Co.; **Robert O. Wilson,** Cosden Petroleum Co.; and **W. G. Julier,** General Petroleum Corp.

Olin Culberson has been elected chairman of the Texas Railroad Commission.

J. W. McDonald, division geologist at Wichita Falls, Tex., for Shell Oil Co., has been transferred to the Tulsa exploration department for a 6-month assignment. Other changes in the firm include: **A. J. Longley, Jr.,** from the regional staff at Houston, to Elk City, Okla., as district exploitation engineer; **L. W. Elderkin,** division production superintendent with the North Texas division, to New Orleans; **J. C. Nichols,** from Lucien, Okla., to the Elk City plant as assistant plant superintendent; and **G. L. Lamar,** superintendent of the Tonkawa, Okla., gas plant, to the Pampa, Tex., plant as superintendent.

Hal G. Sehnert, geologist at Evansville, Ind., for Sohio Petroleum Co., has been transferred to Midland, Tex., as subsurface geologist.

George Velotta, formerly at Shawnee, Okla., with Phillips Petroleum Co., has been transferred to the firm's geological staff at Owensboro, Ky.

Joe M. Jones, formerly chief geologist for Robinson-Puckett, Inc., at Abilene, Tex., has opened offices as consultant there.

O. O. Bump, of Evansville, Ill., has organized Bump Oil Co.

James R. Watson, superintendent of drilling and production for James H. Snowden and Comanche Drilling Co., has been transferred from Throckmorton to Midland, Tex.

J. L. Burke, president of Service Pipe Line Co., has been elected chairman for 1951 of the Committee for Pipe Line Companies, succeeding **William C. Kinsolving,** president of Sun Pipe Line Co. **Ralph B. McLaughlin,** president of Texas Pipe Line Co., was elected vice chairman to succeed Burke. Reelected were: **J. L. Seger,** executive vice president of Interstate Oil Pipe Line Co., treasurer; **Fayette B. Dow,** Washington, D. C., general counsel; and **Gordon C. Locke,** Washington, D. C., executive secretary and associate general counsel.

R. B. Thompson, geologist for Pan American Production Co. at Lafayette, La., has been transferred to Houston.

E. R. Baker, manager of Continental Oil Co.'s central research laboratories, has been named assistant manager of the development and research department, Ponca City, Okla. Baker, wartime assistant research chief in chemical warfare, joined Continental in 1948 as manager of the then newly established central research laboratories. During the war he participated in the development of war gases, flame throwers, incendiary bombs, and other projects, and upon his discharge in 1946 received the Legion of Merit Award for his work in chemical warfare.

Roy E. Deck, assistant general superintendent of Wilcox Oil Co., has been transferred from Borger, Tex., to Bristow, Okla.

Roy S. Belshe, district foreman at Elk City, Tex., for Shell Pipe Line Corp., and **C. A. Richardson,** junior engineer at Houston for Shell, have joined the "Lightline" project in Maracaibo, Venezuela, where they

PERSONALS

will assist Shell Caribbean Petroleum Co. in building its pipe line in the Mara, Maracaibo, district. Belshe will become a civil engineer, and Richardson engineer.

W. P. Larkin, formerly drilling superintendent for McCarthy Oil & Gas Corp. at Houston, has joined Lawson Drilling Co. at Midland, Tex., as drilling superintendent.

D. E. Fickinger, party chief for Continental Oil Co. at Harvey, N. D., has been transferred to Artesia, N. M.

D. L. Ferguson, general manager of Esso Standard Oil Co.'s New Jersey Works, will become assistant general manager of the firm's East Coast manufacturing division January 1, when that division and the New Jersey Works manager's office at Bayway become consolidated. Ferguson will assist **W. F. Thiede,** who remains general manager of the East Coast division.

Willis McGerald Peirce, assistant to the general manager of the technical department of the New Jersey Zinc Co., Palmerton, Pa., has been elected president of the American Institute of Mining and Metallurgical Engineers for 1951. **Joseph L. Gillson,** geologist with E. I. du Pont de Nemours & Co., Wilmington, Del., and **Michael L. Haider,** vice president and general manager of the production department for Imperial Oil Co., Ltd., Toronto, Ont., were elected vice presidents and directors of A.I.M.E. for 3 years.

J. D. Cooper, engineer for Skelly Oil Co. at Duncan, Okla., has been transferred to Hobbs, N. M.

James R. Nolan, formerly petroleum production engineer for Pan American Producing Co. at Snyder, Tex., has joined Cities Service Oil Co. at Oklahoma City, in the same capacity.

Earl R. Lyle, James Edward Bell, H. M. Barnes, Jeff Hawks, and **Winston L. Cox** are directors of Castle Creek Petroleum Co., Inc., of Casper, Wyo., which has recently been incorporated.

Jay E. Thompson, Interstate Oil Pipe Line Co., has been transferred from Billings, Mont., to Tulsa.

William W. Black recently was elected president of Progresso Oil Co. of Albuquerque, N. M. **Charles Stephens** was elected vice president, **Glen Williams,** treasurer, and **Frank B. Bowyer,** secretary. All are of Albuquerque.

Walter Berger and **Charles H. Pishny,** who have been members of the firm of Cummins, Berger & Pishny, have established their own consulting offices in the Commercial Standard Building, Fort Worth. The new firm will continue to engage in consulting, valuations, and geological work.

James W. Nance, formerly geologist with Carter Oil Co. at Craig, Wyo., has joined Pioneer Oil Corp. in Denver.

Stark Fox has been elected a vice president of Oil Producers Agency of California, at Los Angeles, by the board of directors. Fox joined the agency in 1937.

Dr. Charles R. Nelson, head of the process-engineering department of Shell Development Co., Emeryville, Calif., has been elected first director of the American Institute of Chemical Engineers from west of the Rockies. Nelson, who will start his 3-year term in 1951, has spent the last 2 years making studies in his fields of major interest, chemical plant design, in the Netherlands, the United Kingdom, and South America.

DR. T. L. HARRIS

Dr. Thomas L. Harris, Parkersburg, W. Va., a prominent West Virginia surgeon, has been elected a director of Consolidated Natural Gas Co. His election fills a vacancy left by the death last July of John Crawford, board chairman of Parkersburg Rig & Reel Co. Consolidated is the parent company of Hope Natural Gas Co., Peoples Natural Gas Co., East Ohio Gas Co., and New York State Natural Gas Corp.

C. A. Langner, associate petroleum engineer for Humble Oil & Refining Co., has been transferred from Brookhaven, Miss., to New Orleans in the same capacity.

Richard F. Bradley, manager of the aviation division, marketing department, of Standard Oil Co. of California, has been elected chairman of the aviation advisory committee of the American Petroleum Industries Committee for 1951.

Roy Fairchild, tool pusher for Makin Drilling Co., has been transferred from Roswell, N. M., to the Eunice, N. M., area where the company is drilling for Continental Oil Co. Other tool pushers changed include: **A. V. Cagle,** from Farmington, N. M., to the Eunice area; **Glenn Strange,** from Farmington to Artesia, N. M.; and **A. F. Webster** to Roswell.

W. J. Lenahan, assistant vice president and government-relations manager for Trans-Arabian Pipe Line Co., has been awarded the Lebanese Gold Medal of Merit, First Class, by the president of the Near East republic. Lenahan negotiated the convention with Lebanon under which Trans-Arabian acquired transit and terminal rights in the country.

Tevis F. Morrow has purchased controlling interest in North American Oil Consolidated, San Francisco, and will serve as president and member of the board. The following five officers were elected as directors: **Martin L. Kline,** vice president; **John L. Lawton,** secretary-treasurer; **C. M. Baysinger, Jr.,** and **Clinton R. Erd,** both named assistant secretary-treasurer. Lawton is the only member of the former board to remain a director. Baysinger formerly was assistant secretary.

William S. Frisbie, Frisbie & Yancey Drilling Co., Tulsa, was elected chairman of the Tulsa chapter of the American Association of Oilwell Drilling Contractors, succeeding **B. E. Groenewold,** Exploration Drilling Co., Tulsa. **A. R. Olson,** Olson Drilling Co., was elected vice chairman, and **Robert D. Snow,** H. & S. Drilling Co., was elected secretary and treasurer.

Roy Ralston, Ashland Oil & Refining Co., has been transferred from Henderson to Ashland, Ky., where he will be administrative assistant to **J. Howard Marshall,** president of the firm.

Irvin B. Murray, Jr., geologist for The California Co., has been transferred from Miles City, Mont., to New Orleans.

L. T. Hart, district geologist for Carter Oil Co., has been transferred from Rawlins, Wyo., to Vernal, Utah. Other Carter men transferred with Hart include: **W. W. Sloan, William V. Naylor,** and **G. L. Vinson.**

Frank Reedy, formerly geologist for Crown Central Petroleum Corp. at Houston, has joined Republic Natural Gas Co. at Dallas as chief geologist.

PERSONALS

C. M. Davis, formerly assistant professor of petroleum engineering at Missouri School of Mines, Rolla, Mo., is now affiliated with the school of mineral industries at Pennsylvania State College as assistant professor of petroleum and natural-gas engineering.

Jack Abernathy, Big Chief Drilling Co., Oklahoma City, has been elected chairman of the Central Oklahoma chapter of the American Association of Oilwell Drilling Contractors, succeeding **Earle C. Fleshner,** Johnson & Fleshner Drilling Co., Oklahoma City. Other officers elected include: **George B. Kitchel,** vice chairman, and **W. R. Ewert,** secretary, both with Kerr-McGee Oil Industries, Inc., Oklahoma City.

C. H. Browning, station engineer for Shell Pipe Line Co. at Wood River, Ill., has been transferred to Richland, Mo. Other changes include: **E. E. Free,** station engineer, from Pauls Valley to Osage, Okla.; **J. H. Fry,** station engineer, from Ray to Fairland, Okla.; **G. W. Hoel,** station engineer, from Pauls Valley to Emmett, Mo.; **E. H. Kemner,** assistant mechanical maintenance supervisor, from Rolla to Springfield, Mo., as mechanical maintenance supervisor; **K. W. Looney,** assistant pipe-line maintenance foreman, from Osage to Yarna, Mo., as pipe-line maintenance foreman; **Tim McGregor,** area maintenance supervisor, from Cushing, Okla., to Springfield; **G. D. Riley,** station engineer, from Midway, Okla., to Diamond, Mo.; **O. A. High,** station engineer, from Ryan to Healdton, Okla.; **L. W. Kinison,** safety instructor, from Cushing to Pauls Valley as pipe-line maintenance foreman; **T. C. Raynes,** district chief gager, from Udall, Kans., to Midway, Okla., as station chief; and **J. R. York,** from station engineer to district chief gager, Udall, Kans.

G. J. Pribble, production foreman for Shell Oil Co. at Freer, Tex., has been named district foreman. Other changes include: **J. O. Gumm,** production foreman, transferred from Premont to Eagle Lake, Tex.; **D. E. Jones,** exploitation engineer, from Corpus Christi to Freer as production foreman; **J. R. Patterson,** exploitation engineer, from Houston to Kilgore, Tex.; **H. F. Pierce,** exploitation engineer, from Corpus Christi to Kilgore; **C. A. Watts,** exploitation engineer, from Kilgore to Corpus Christi; **W. K. Smith,** exploitation engineer, from Kilgore to Houston; **M. W. Pape,** district foreman, from Eagle Lake to Premont, Tex.; **W. B. Banks,** mechanical engineer, from Midland, Tex., to the Tulsa area; **I. E. Barber,** exploitation engineer, from Midland to Tulsa; **J. R. Dodge,** exploitation engineer, from Houston to Odessa, Tex.; **R. L. Kastor,** mechanical engineer, from Tulsa to Midland; **H. J. Kobusch, Jr.,** mechanical engineer, from Midland to the New Orleans area; **E. R. Rhodes,** mechanical engineer, from Midland to the New Orleans area; **H. O. Rorem,** mechanical engineer, from Midland to New Orleans; **L. J. Willis,** exploitation engineer, from Midland to the Odessa division.

Frank E. Lewis, formerly director of exploration for Cooperative Refinery Association, Kansas City, Kans., has moved to Midland, Tex., where he will operate as an independent trader and geological consultant.

Ralph W. Collins, formerly division engineer of the North Texas-New Mexico division of Stanolind Oil & Gas Co. at Fort Worth, has been named assistant to **M. C. Hoffman,** vice president of Pan-Am Southern Corp., Shreveport, La. Collins had been with Stanolind since 1936.

L. W. Dorbandt, geologist and registered professional engineer, has opened consulting offices in Abilene, Tex. He was recently connected with Bradford Oil Corp. in Midland, Tex., and prior to that was in charge of the geological department of Stanolind Oil & Gas Co. in Abilene.

H. L. Turner, formerly president of Turner Oil & Gas Corp. at Denver, has moved to San Angelo, Tex., where he will be an independent producer.

Fred H. Townsend, division superintendent for Transcontinental Gas Pipe Line Corp., has been transferred from Corpus Christi, Tex., to Orange, Va.

M. P. Watson, New Orleans, has been appointed chairman of the production committee for the A.S.M.E. petroleum division. Other petroleum-division appointments are: **E. H. Warren,** Ohio, chairman of the transportation committee; **O. L. Lewis,** Los Angeles, chairman of the refining committee; **M. S. Northrup,** New Jersey, chairman of the materials committee; **A. C. Stutson,** New York, chairman of the application committee; and **R. B. Tuttle,** Tulsa, chairman of the press committee. **F. V. Daasch,** Gulf Oil Co., Tulsa, will serve as vice chairman of the production-engineering committee, and **Dr. E. N. Kemler,** University of Minnesota, Minneapolis, has resigned the chairmanship of the production committee to accept a new appointment as research secretary for the division. **J. M. Sexton,** formerly chairman of the manufacturers committee and secretary of the division, replaces **E. W. Jacobson** as chairman of the division.

DEATHS

Ralph Clayton Holmes, 76, who retired as president of The Texas Co. in 1934, died at his winter home, Orlando, Fla., December 23. His summer home was at Shinglehouse, Pa., where he was reared. Holmes was associated with The Texas Co. practically from its beginning. He became superintendent of its first refinery at Port Arthur, Tex., in 1902 and later was vice president of the company in charge of its manufacturing department which operated a number of refineries in all parts of the United States. With Fred Manley, an early associate, he was the developer of the Holmes-Manley cracking process which was widely used at The Texas Co. refineries and those of other companies. Funeral services were held at Houston.

Levi M. Johnson, 68, veteran connection foreman for Service Pipe Line Co., died December 25 in Tulsa.

Harry Boxell, 55, Phillips Petroleum Co. production superintendent, died in Bartlesville, Okla., December 24. He had worked for Phillips for 28 years, and served as superintendent at Bartlesville for the past 4 years.

Charles Howard Smith, 66, prominent industrialist and engineer and inventor in the fuels field, died December 16, in Short Hills, N. J. Among the companies of which he had served as president were: Big Inch Oil Co., General Oil Gas Co., American Automotive Gas Producers Corp., Middle States Natural Gas Corp., and Southern Shipbuilders & Dry Dock Corp.

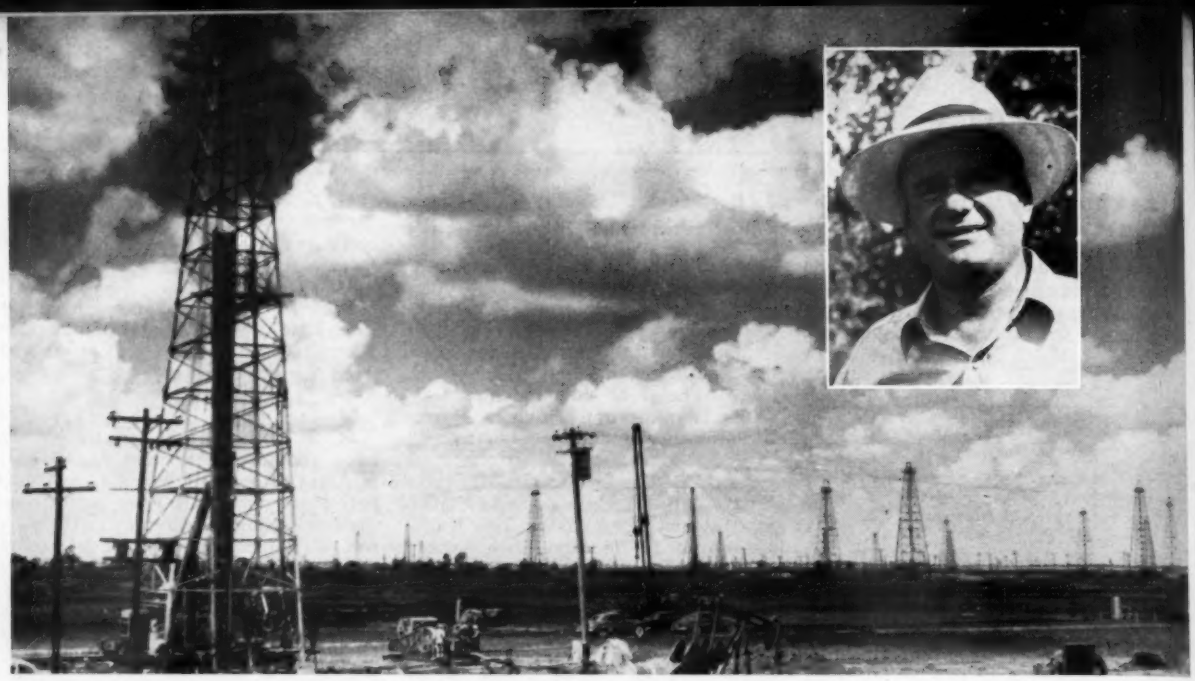
George L. Pace, 68, founder and president of Pace Petroleum Co., died in a fire at Duncan, Okla., December 26.

Francis B. Thorne, 58, chairman of the board of directors of North Central Texas Oil Co., Inc., died December 16 in Islip, L. I., N. Y.

Maco Stewart, president of Stewart Oil Co., Galveston, died December 16.

Joseph Glen Smith, 45, junior engineer for Humble Oil & Refining Co., Houston, died December 19.

Chester H. Lundt, 53, chief mechanical engineer for Humble Pipe Line Co., Houston, died December 19.



REBIRTH.—Panorama view of portion of Blue Ridge field where new drilling and producing methods have resulted in a comeback in a wilderness of dry holes. Inset shows Johnny Mitchell, Houston, associate partner of Sam Maceo Oil Operations, Inc., who has been active in redrilling the flanks of the Blue Ridge salt dome.

Blue Ridge Field Stages Comeback

Revived after 30 years, field has more than doubled its production of a year ago

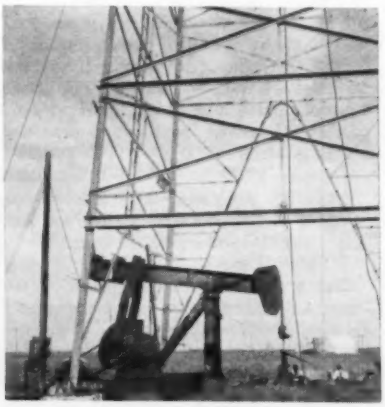
REDRILLING of abandoned leases and application of modern completion and producing methods have resulted in a comeback for Blue Ridge salt dome field. Currently, the field is yielding about 900 bbl. of oil per day from 62 wells as compared with a daily average of 425 bbl. from 50 wells in June 1949.

Blue Ridge is a typical example of a field which has been revived again after 30 years. During that period, the use of poor completion and producing methods combined to result in low efficiencies of recovery and low rates of field output.

by Joseph A. Kornfeld
Houston District Editor

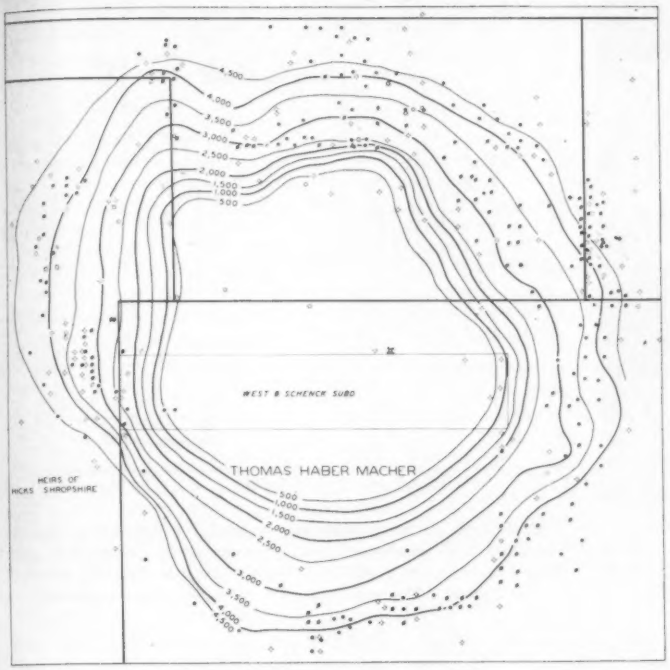
Location.—Blue Ridge salt dome is situated 12 miles southwest of Houston in eastern Fort Bend County, Texas. The dome occupies portions of the Edward Drew, Thomas Habermacher, Hicks Shropshire, and J. Poitevent surveys. With respect to other salt domes in the area, the dome is situated approximately as follows: 5 miles northeast of Big Creek dome, 6 miles north of Thompsons field, and 10 miles southwest of Pierce Junction field.

Independents active.—Although many leading companies have operated in this field in the past, Blue Ridge today is being operated largely by 16 independent companies. Most of these firms own small leases, the average being a three-well lease on a 10-acre tract. Well ownership and production allowables for the field are:

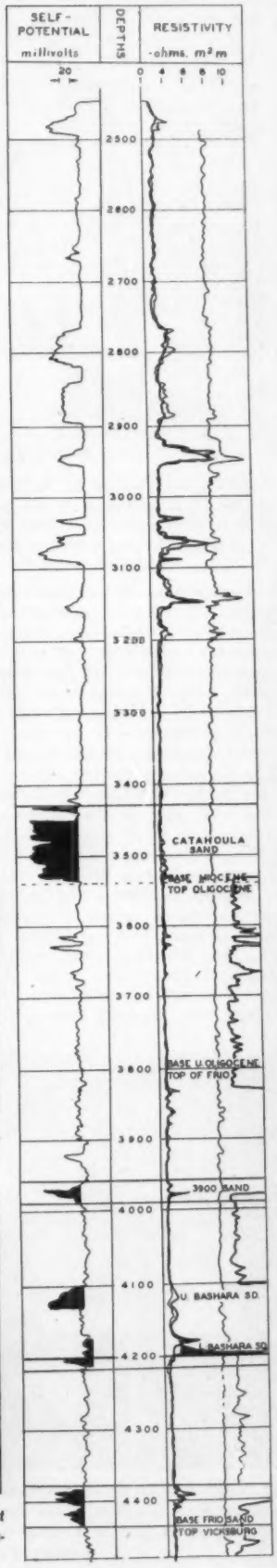


FLOWING FROM FRIO.—View at extreme left is of the high-pressure well head at 8 Robinson-Bashara, a Frio sand producer on the west flank of Blue Ridge field which has been flowing for the past 6 years with a drop of only 50 psi. in top-hole pressure.

MYSTERY WELL.—View at left shows Texas Gulf Producing Co. 4 West & Schenck, which is still producing 35 bbl. of pipe-line oil per day after 22 years on production. All efforts to find this 3,730-ft. sand in offset wells have proved failures and geologists believe the sand was a stringer perched on the flank of the dome.



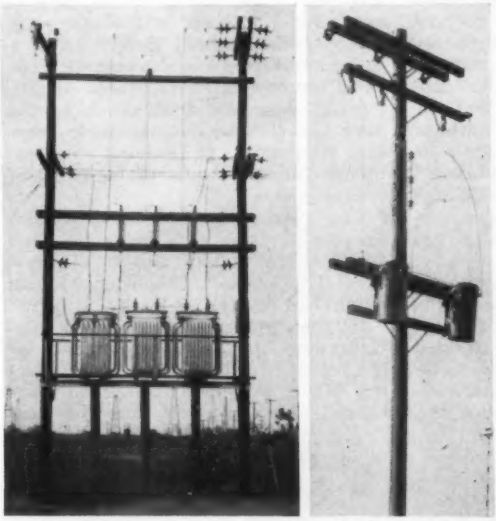
Left: Structural contour map on top of the salt at Blue Ridge piercement-type dome, contour interval 500 ft. (Base map courtesy Jingery Map Co., Houston).



Right: Type electric log for west flank of Blue Ridge field, showing formations extending from a depth of 2,500 ft. into the top of the Vicksburg (Oligocene) formation. Mud resistivity 4.0 ohms m^2/m at 142° F. Surface elevation, 92.5 ft.

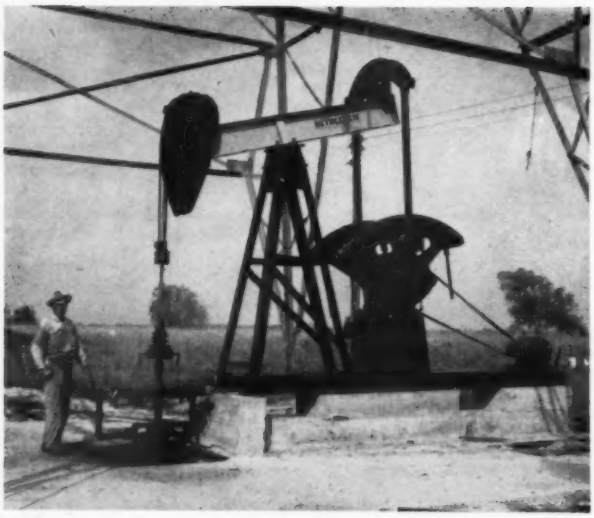
WELL OWNERSHIP AND ALLOWABLES, BLUE RIDGE OIL FIELD

Operator—	No. leases	No. oil wells	Total allowable bbl./day
Gulf Oil Corp.	3	4	96
Hagen, Cecil V.	1	5	43
Hawkins, H. L.	3	4	180
Johnson & Appling et al.	1	1	40
Krause, L. M.	1	1	14
Lee, George C. et al.	1	1	60
Lee, G. J.	1	5	238
Leon, Harold	3	5	58
Maceo Oil Operations, Sam	3	9	210
Oil Drilling, Inc.	2	2	80
Phillips Petroleum Co.	1	3	110
Raimer, S. S.	1	1	10
Reclamation Production Co.	1	2	30
Sharp, Thomas I.	1	2	20
Shudde Bros. & W. H. Telschow	1	1	20
Texas Consolidated Oils	2	2	35
Texas Gulf Producing Co.	3	7	76
Total	29	55	1,320

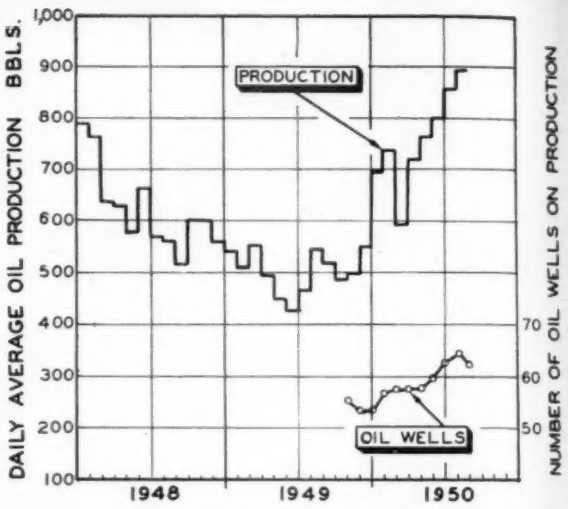


Transformer installations by Houston Light & Power Co.-Gulf Oil Corp., and Texas Consolidated Oils, Inc.

***GAS-LIFT PLANT.**—View of compressor building on the southwest flank of Blue Ridge field. This plant comprises a 75-hp. compressor with a capacity of 500 M.c.f. per day with a maximum discharge pressure of 600 psi. It has lifted as much as 500 bbl. of gross liquid per day.*



FLANK OIL.—View of Oil Drilling Co. et al. 1 Kathleen Broun producing its allowable to 60 bbl. per day from 3,834-38 ft. in top of a 40-ft. sand zone. E. (Buddy) Jorden, rig contractor, is shown at bleeder. He has drilled at Blue Ridge for several operators.



TIMEGRAPH showing upswing in total oil production due to redrilling and improved completion methods. Production was upped from a low of 425 bbl. in June 1949 to 900 bbl. per day for August 1950, when 12 new oil wells were completed.

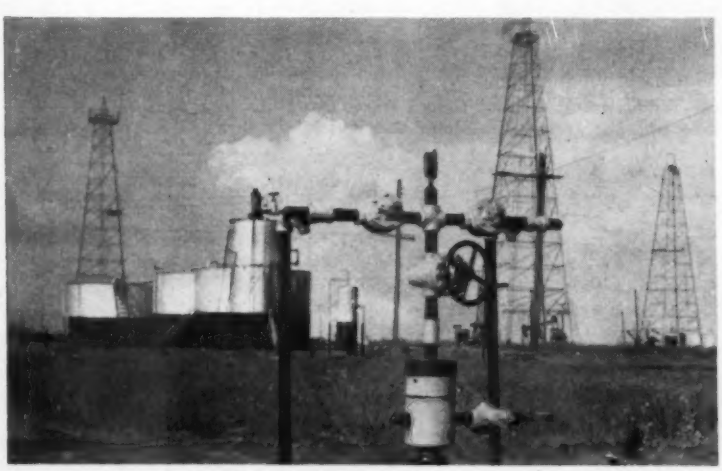
Economics.—Economic factors which have attracted independents to this field are: (1) the high price of crude oil, (2) relatively shallow drilling depths (200 to 4,891 ft.) as compared with other piercement-type coastal domes, (3) absence of salt or caprock overhang, (4) the fact that the dome produces at nearly all parts of the periphery, (5) the relatively wide producing belt on all flanks except the west side in the Miocene, Middle Oligocene, Frio, and Vicksburg reservoirs, and (6) absence of high gas pressures in the Miocene sands.

Highly faulted.—The existence of an extensive series of radial faults and at least two peripheral faults in the pre-Miocene zones have divided these Tertiary oil sands into relatively small oil reservoirs. This condition has brought into practice the necessity for the application of a close spacing pattern adequately to drain the oil in the highly tilted belt of sands lying adjacent to the salt mass. Most of the current development is being conducted on spacings as close as 2 acres per well. This distinguishes this field from some of the other coastal producing fields from the standpoint of spacing requirements, development problems, and recoveries.

One producing company that has operated in this area for more than 20 years states that "the little fellow here that pays careful attention can obtain fair returns on his investment."

Independents like Sam Maceo Oil Operations, Inc., are responsible for the recent revival of Blue Ridge. During November 1947, this firm purchased five old wells on the east flank and since has drilled four new producers and deepened another well in the field. Production has been built up to 240 bbl. of oil per day from 10 wells. Maceo's 7 Luscher, located on the east flank of the dome, was initially completed early in 1950 from the 2,800-ft. Miocene sand for a potential of 135 bbl. of oil per day. Initial shut-in tubing pressure was 250 psi. The excellent performance of this well is reflected in the fact that during the past 7 months the surface tubing pressure has dropped only 20 psi. while operating at the allowable of 60 bbl. per day.

Another independent who has built up production profitably from sands flanking the salt mass is Harold Leon, of Houston. During 1939 he acquired 55 acres on the north flank. On these holdings, he owned one well produc-



STAYING QUALITIES.—Additional reserves have been found by redrilling the shallow Miocene sands on the east flank of Blue Ridge. Here is the Sam Maceo Oil Operations, Inc., 7 Luscher which has lost only 20 psi. of surface tubing pressure during the past 9 months.

PUMPING UNIT.—Installation at H. L. Hawkins 2 R. Davisson on the east flank of Blue Ridge. It is powered by a 10-hp. 440-volt motor equipped with time clock.

ing 11 bbl. of oil. Today, he has five wells making 58 bbl. on a total leasehold of 141 acres. During 1942, he ran gamma ray-neutron log at his "C"-4 Blakely (original total depth 2,067 ft.), and perforated a shallow oil sand at about 1,700 ft. which drew an initial potential of about 80 bbl. per day. He replaced old wooden rig fronts with modern electric-powered pumping units. One-inch pumping barrels were installed, and but few workovers have resulted as a result of gas lock or sand invasion.

Frio sand development.—On the northwest flank, the Maceo interests recently purchased an abandoned well, 1 Roubash, which was originally drilled to a total depth of 4,088 ft. (Schl.). Operators perforated the casing from 4,024-40 ft. in a sand lying immediately above the salt topped at 4,060 ft. Initial production was 55 bbl. per day on a 7/64-in. choke with flowing tubing pressure of 200 psi. The well has been flowing for the past 3 months with no apparent decline in productivity.

Typical of recent redrilling of the field are Frio sand completions drilled on the northeast flank. Oil Drilling, Inc., 1 Kathleen Broun, located 61 ft. out of the southwest corner of Lot 1, Block G, in the Edward Drew Survey, was finaled August 31, 1950, from 40 ft. of Frio sand logged from 3,830-78 ft. It is pumping its allowable of 60 bbl. from casing perforations from 3,834-38 ft. Uniquely, it is an east offset to Frio sand production developed during 1936 and 1937 by the old Trans-State Oil Co. which is reported to have produced 350,000 bbl. of oil from 20 acres along the same contour.

Thin stringers.—Profitable oil well completions have been made this year in thin stringers in the upper Frio sand series on the northeast flank of the dome. Shudde Brothers, Houston, "A"-1 Bassett Blakely ran gamma ray and neutron log in an old well drilled about 10 years ago. Recompletion was made during March 1950 in a stringer topped at 3,256-76 ft. of which only a few feet of pay was effective. On initial test, the well flowed 40 bbl. of oil per day. During the first 15 days of production, it put 640 bbl. of oil into the tanks. Currently, it is flowing 18 bbl. of oil per day.

A short distance to the southeast on the same flank, J. P. Petkas, Houston, 1 Blakely, located 50 ft. from the east line and 250 ft. from the north line of Block F in the Edward Drew Survey, was completed during November 1950 in a 10-ft. sand from 3,214-24 ft. Initially, it flowed 75 bbl. of 35.7° A.P.I. oil per day with a flowing tubing pressure of 320 psi. Originally, it was drilled to a total depth of 3,688 ft. and perforations from 3,632-45 ft. and from 3,450-65 ft. were unproductive and were squeezed off.

Vicksburg discovery. — A deeper pay for Blue Ridge field—the Vicksburg—was discovered during August 1950 on the northwest flank of the dome by H. L. Hawkins of Houston. His 1 Scott, drilled on a 10-acre tract in the Edward Drew Survey, was completed from casing perforations from 4,804-91 ft. or 126 ft. in the Vicksburg. Initial production was 142 bbl. of oil produced through a 12/64-in. choke. This well, drilled to a total depth of 5,004 ft. in the Jackson formation, was located downdip from a group of three dry holes which were drilled to depths ranging from 4,600 to 4,620 ft.

Deeper possibilities. — Possibilities of finding deeper reservoirs in the Vicksburg are suggested because of (1) regional position among Vicksburg sand producing areas such as Pierce Junction, Mykawa, and Thompsons, (2) occurrence of sand bodies up to 50 ft. in thickness in the upper 300 to 400 ft. of the normal Vicksburg section at Thompsons and Mykawa fields, and (3) local truncation of the upper portion of the Vicksburg formation immediately below the salt core at Blue Ridge. (See section under Stratigraphy: Vicksburg Formation.)

Directional drilling.—In some cases, as at Sam Maceo Oil Operations, Inc., "B"-13 Blakely on the northeast flank, production was increased by a major workover. In September 1950, before workover, output had slumped to 5½ bbl. of oil per day. The well was producing through a hole in the casing. The 150 ft. of screen-and-liner setting, originally run during 1925, was completely plugged. Workover crews cut and pulled the screen and liner, plugged back the well, and side tracked down the dome to complete in a new pay from above 4,015 ft. After workover, the well made its allowable of 60 bbl. per day without difficulty.

Road costs.—Operating difficulties are hampered by the inaccessibility of some field roads in the rainy, winter season. To facilitate moving in material and servicing, some independents have constructed shell-surfaced roads. G. L. Lee estimates that he spent $1,000 for 1,500 ft. of road for 4 to 6 in. of shell. This was laid on a soil base 10 ft. in width and the road was graded to 1 ft. above the average profile.

Drilling Methods

Drilling contractors. — Among the drilling contractors active at Blue Ridge are: Livingston Drilling & Well Service C., Gilger Drilling Co., Conroe Well Service Co., and J. P. Petkas. Good records for penetration rates

(Continued on page 76)

FIELD STATISTICS—BLUE RIDGE OIL FIELD, FORT BEND COUNTY, TEXAS

Method of exploration: Topography, gas seepages.
Date of dome discovery: 1903.
Date of first oil production: April 4, 1919.
Discovery well: Gulf Oil Corp., "C"-2 Bassett Blakely.
Geology:
Structure: Piercement-type salt dome.
Cap rock (shallowest point drilled), ft. 143
Salt (shallowest point drilled), ft. 230
Reservoirs:
Supercap: (depth from surface in ft., and A.P.I. oil gravity), 200 ft. (14°).
Miocene: 1,650-72 (18°), 2,275-80, 2,530-40 (20°-26°), 2,640-2,894 (27°-29°), 2,930-3,040 (28°).
Middle Oligocene: 3,610-3,800 (37°).
Oligocene: Frio 3,900-4,030 (39°), 4,102-12 (38°), 4,200-12, 4,654-4,660; Vicksburg 4,804-91.
Wells:
Flowing oil wells (November 1, 1950) 10
Pumping wells 49
Gas lift 3
Deepest well drilled: McCarthy Oil & Gas Corp. 1 W. H. Ector, Thos. W. Thompson Survey, southeast flank, TD 13,578 ft. (Schl.) Log run July 4, 1949.
Deepest formation tested: Upper Yegua (Eocene) formation.
Number of rigs active (November 1, 1950) 4
Production:
Cumulative oil production to September 1, 1950, bbl. 12,990,504
Current production on September 1, 1950, bbl. per day 893
Current allowable (as of November 1, 1950), bbl. per day 1,320
Method of allocation ..... per well
Peak year of production 1928
Annual oil production in peak year, bbl. 2,205,000
Principal operators:
Sam Maceo Oil Operations, G. L. Lee, H. L. Hawkins, Harold Leon.
Pipe-line outlet: Gulf Refining Co.

Globe Refining Solves Some Operating Problems—

by R. B. Pierce* and J. M. Lawson†

Problem: Vacuum-tower exchanger corrosion.
Solution: Direct-contact condensation.

Problem: Improper closing of check value on cat cracker air line.
Solution: Pivoted dashpot.

Problem: Reduction of bottom sediment in storage tank.
Solution: Distributing inlet spider.

IN Globe Oil & Refining Co.'s 30,000-bbl per day refinery at Lemont, Ill., operating problems encountered from time to time have been solved by modifications in equipment resulting in relatively trouble-free operation. Several of these problems and the solutions developed by Globe's technical personnel are described here.

These items include (1) installations of spray rings for direct-contact condensation of gas-oil vapors to eliminate corrosion difficulties with tube-bundle exchanger equipment, (2) redesign of check-valve dashpot linkage to prevent shaft binding and sticking of the valve on the air line to a cat cracker, and (3) installation of an inlet distributing spider in an 80,000-bbl. crude-storage tank to reduce bottom sediment accumulation.

Direct-Contact Condensation

By employing direct-contact gas-oil condensation on a vacuum tower at the Lemont refinery, a solution was found to the problem of severe tube-bundle corrosion occurring in a liquid-vapor heat exchanger when processing sour crude.

Operations at this refinery include vacuum distillation of topped crude for production of asphalt. In processing sour crude *(see article on Globe sour-crude operation in The Oil and Gas Journal, September 30, 1948, page 96)* considerable difficulties have been experienced in the past with the heat-exchange system on a vacuum tower. The original installation was made with a vapor-to-liquid exchanger in which gas-oil vapors leaving the top of the vacuum tower furnished heat for crude-oil feed to the distillation section of the refinery. Due to severe corrosion, necessitating frequent replacement of tube bundles in the vapor-liquid exchanger-condenser, this unit was eliminated for a time.

*Superintendent, and †chief engineer, Globe Oil & Refining Co., Lemont, Ill.

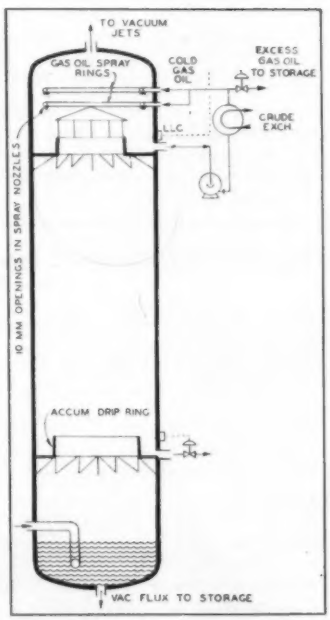


Fig. 1—Direct-contact condensation of gas-oil vapors on vacuum tower at Globe Oil & Refining Co.'s Lemont plant.

However, to obtain efficient heat recovery and effect condensation of gas-oil vapors, the direct-contact condensation system shown in Fig. 1 was designed and installed at the Lemont refinery. Gas oil which is drawn off toward the top of the vacuum tower is first heat exchanged with incoming crude employing conventional shell-and-tube equipment. Since this is a liquid-to-liquid exchanger, no abnormal difficulties are encountered with respect to corrosion. A portion of the gas oil is removed to storage for use as feed to a fluid catalytic cracking unit, its flow being regulated by a liquid-level controller as indicated in Fig. 1. The remainder of the cold gas oil is returned to the top of the vacuum tower through two spray rings to contact with rising gas oil vapors, thus effecting their condensation.

A possibly similar condensation system is mentioned in discussion of vacuum distillation operation at the Lake Charles, La., Cit-Con refinery. *(The Oil and Gas Journal, March 24, 1949, page 201)* in which a circulating reflux is used to condense gas oil in the top of the tower.

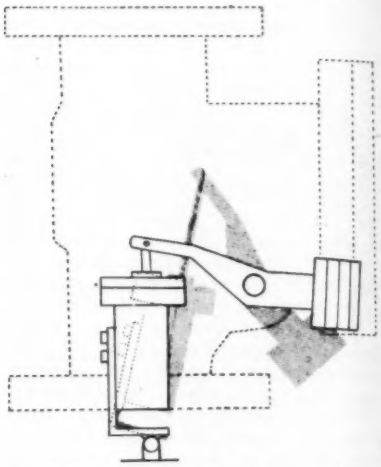


Fig. 2.—Illustrating operation of movable dashpot installed with check swing valve in air line to fluid cracking unit.

Direct contact cooling with oil and water sprays in quench towers has been employed in butadiene and other petrochemical manufacture. In the Ciudad Madero refinery and other refineries in Mexico direct contact condensation of gasoline vapors with water is employed, although, in at least one Mexican refinery, ammonia is injected to minimize corrosion. Cast-iron condensers equipped with several perforated plates are used at the Ciudad Madero refinery. This, however, is a different matter from contacting gas-oil liquid and vapors. Direct-contact condensation employing water cooling possesses disadvantages in that more water is required

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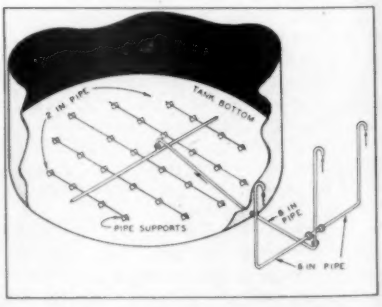

Fig. 3.—Inlet distributing spider installed in 80,000-bbl. crude storage tank.

Water Flooding in Weber Pool

—Washington County, Oklahoma

by Kenneth H. Johnston* and James A. West*

PART 3

THIS article is the third and concluding installment of a series on water-flooding in Weber pool.

Part 1 (December 7, 1950 issue, pages 79, et seq.) gave development map detailing the area covered by Weber pool and location of all secondary-recovery projects; also included was a complete oil-production graph by years for the entire pool showing increased production due to secondary-recovery operations to date.

Part 2 (December 14, 1950, pages 90 et seq.) discussed water-flood projects developed by Keener Oil & Gas Co. and Bruce Oil Co.

This Part 3 installment details water-flood projects conducted by Sunray Oil Corp., Forest Oil Corp., Winona Oil Corp., and Hoyt Oil Co.

Sunray Oil Corp. (formerly Barnsdall Oil Co.).—Barnsdall Oil Co. was granted a permit in 1948 to water flood 180 acres in 33-27n-13e and 4-26n-13e in the south central part of Weber pool. After flooding was started, Barnsdall was combined with Sunray Oil Corp. and the project is now operated by the latter company.

Gas injection was started, on the leases flooded in 1931, when two old oil wells were used for input wells. An average of approximately 52,000 cu. ft. of gas was injected daily during the first 10 years of operation. Another gas-injection well was completed in 1941, and an average of approximately 87,000 cu. ft. of gas was injected daily between 1941 and 1945. During the latter part of 1945, a fourth injection well was drilled and an average of approximately 127,000 cu. ft. of gas was injected between 1946 and 1948.

Development of the property for water flooding was started in 1949, and the average volume of gas injected daily was decreased to approximately 75,000 cu. ft. From an extrapolation of the production decline curve it was estimated that approximately 858,000 bbl. of oil, equivalent to 4,767 bbl. per acre, or 165 bbl. per acre-foot of sand, would have been produced by primary-production methods, and that approximately 296,000 bbl. of oil, or 1,644 bbl. per acre, or 57 bbl. per acre-foot of sand, was gained by repressuring and the drilling of 11 additional oil wells.

Initial development for water flooding was limited to the 100 acres in 33-27n-13e. The 100-acre tract was developed on an irregular five-spot pattern with a spacing of approximately 440 ft. between like wells. New water-input wells were located so as to complete five-spot patterns by utilizing the old wells as producers. Early in 1950, development of the south 80 acres was started. The status of the entire 180-acre development on June 30, 1950, is shown in Fig. 7.

The water-input wells were cased with 10-in. surface casing to a depth of 20 to 40 ft. and 2-in. tubing with a 7-in. casing shoe on the bottom was set and cemented at the top of the oil sand. The water-input wells were not shot.

Water for flooding is obtained from a well completed in the Arbuckle limestone at a total depth of 2,647 ft. The top of the Arbuckle group was penetrated at 1,751 ft. and the Roubidoux water sand was drilled between 2,415 and 2,450 ft. A string of 7-in. casing was set and cemented at the top of the Arbuckle.

The water-supply well was completed prior to the completion of the drilling program and was not produced for several months. It was found upon testing that the capacity of the well was less than 2,000 bbl. of water daily. The dolomite section of the Arbuckle was then acidized with 5,000 gal. of acid, and the Roubidoux sand was shot with 135 qt. of nitroglycerin to increase the productivity of the well. This increased the well capacity to at least 5,000 bbl. of water daily.

Water-Supply Plant

The water-supply plant uses a closed system, in which the water-supply well produces into a 1,000-bbl. supply tank. A diesel-oil seal on top of the water protects it against exposure to atmosphere. A float-type liquid-level controller operates a Reda pump in the supply well to maintain the proper operating fluid level in the tank. The water-injection pump is a gas-engine-driven, 4½ by 6-in. triplex unit equipped with porcelain plungers. There is no chemical treatment of the water. The water-distribution system consists of a tapered main line made up of 4, 3, and 2-in. cement-lined pipe with 1½-in. laterals to the input wells. The water meters, pressure gages, and control valves are located at the input wells.

The oil-gathering system consists of a 4-in. main line with connecting 2-in. lateral lines to the producing wells. Most of the producing wells are pumped by a central power, but individual electrically driven pumping units are being installed.

Water injection was started in Jan-

*Petroleum engineer, Bureau of Mines.

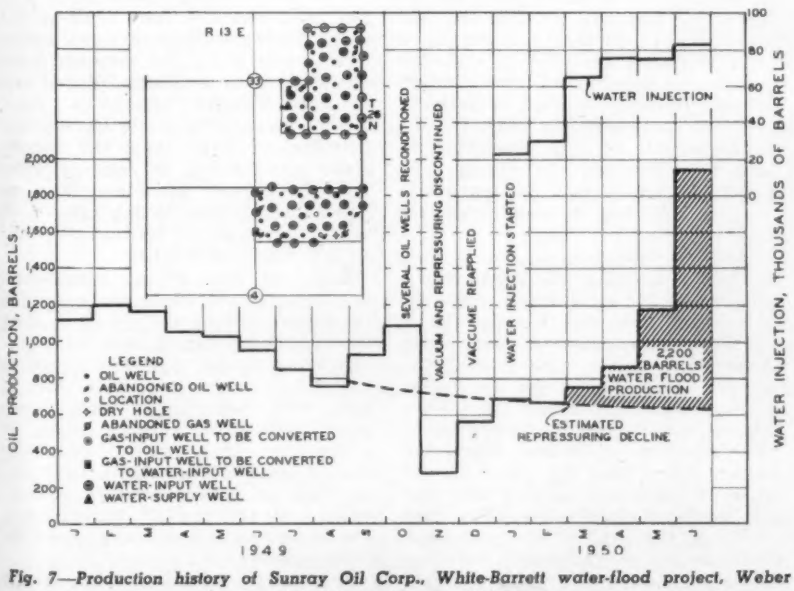

Fig. 7—Production history of Sunray Oil Corp., White-Barrett water-flood project, Weber Pool, Washington County, Oklahoma.

uary 1950, when approximately 86 bbl. of water daily, or about 3 bbl. of water per foot of sand, was injected into each of 28 input wells. In March 1950 water was being injected into 32 input wells on the north 100-acre tract at a rate of 3 bbl. daily per foot of sand. The production history of this tract is shown graphically in Fig. 7. The first increase in the rate of oil production resulting from water flooding occurred in March 1950, when the monthly rate of oil production increased to 746 bbl. from a previous monthly average of 600 bbl. From March 1950, the monthly rate of oil production increased to 1,939 bbl. in June 1950. Based upon a normal decline for repressuring operations, it is estimated that approximately 2,200 bbl. of oil was gained by June 30, 1950, from water flooding the north 100 acres of this project. Water flooding has not been in progress long enough to provide adequate data to indicate the ultimate success or failure of the project.

Oil-production history of the tracts flooded, by years from 1906 to 1949, inclusive, summary of water-flood performance, and monthly volumes of water injected from January through June 1950 are shown in Table 4. The volumes of water injected monthly include all the water injected into inside input wells and Sunray Oil Corp.'s proportionate share of the water injected into jointly owned line wells.

Forest Oil Corp.—In September 1948, Forest Oil Corp. was granted a permit to water flood 575 acres of its properties in the north central part of Weber pool in Sections 27, 28, and 34-27n-13e. The greater part of this area covers leases that previously were subjected to repressuring (see Project 2, Fig. 1). Repressuring was started in 1928, when two old oil wells were converted to injection wells. Two years later the project was expanded by the drilling of two new injection wells and the conversion of one old oil well. Two more oil wells were converted to injection wells in 1933. The injection pattern was completed by the drilling of two additional wells, one in 1935 and one in 1947.

At the start of repressuring operations, air was used as the driving medium. After several years, however, the produced gas became too lean for use as fuel, and one compressor was converted to the produced air-gas mixture. After reinjection of the mixture, the produced gas became rich enough for use as fuel, but all surplus gas is still returned to the oil sand. During the life of the project no effort was made to control or measure the volumes of air and gas injected and it was not possible to estimate the volumes of repressuring medium injected into the producing formation.

It is estimated that approximately 2,931,000 bbl. of oil, equivalent to 6,043 bbl. per acre, or 203 bbl. per acre-foot of oil sand, would have been produced from leases included in this area by January 1950 through primary-recovery production methods, and that approximately 644,000 additional barrels of oil, amounting to 1,328 bbl. per acre, or 45 bbl. per acre-foot, was gained by repressuring and drilling 26 additional oil wells.

Initial development of the project for water flooding consisted of the drilling of 10 water-input wells in cooperation with the Keener Oil & Gas Co. along common property lines. These wells were so placed along the property lines and at the corners of the leases that the Forest Oil Corp.'s interest was equivalent to 5¼ wells. The injection of water from the Keener Oil & Gas Co. plant on the adjacent lease was started into the line wells in April 1949. The first effect on the rate of oil production from the old oil-producing wells on Forest Oil Corp. properties was noted in August 1949.

Forest Oil Corp. cooperated with Barnsdall Oil Co. (now Sunray Oil Corp.) in the drilling of three water-input wells along the common property line of its respective floods late in 1949. Forest's interest in these wells is equivalent to 1¼ input wells. Injection of water from the Sunray plant was started in January 1950. To July 1, 1950, there had been no noticeable increase in the rate of oil production from offsetting oil wells on the Forest properties.

Early in 1950 Forest constructed a water-pressure plant and extended the water-flooding project by drilling 14 input wells and 5 new oil wells. The development map (Fig. 8) shows the status of the project on July 1, 1950. The water-input wells were cased with 10-in. surface casing to a depth of 20 to 40 ft., and 2-in. cement-lined tubing with a 7-in. casing shoe on bottom was set and cemented at the top of the oil sand. The water-input wells were shot with nitroglycerin.

Fresh water for injection is pumped from Coon Creek into a settling pond

TABLE 4—SUMMARY OF OPERATIONS, SUNRAY OIL CORP., SILAS WHITE-J. C. BARRETT PROJECT, WEBER POOL, WASHINGTON COUNTY, OKLAHOMA

Location—33-27n-13e
Sand flooded—Bartlesville
Top sand—1,230 ft.
Effective sand thickness—29.4 ft.
Productive area—100 acres
Area developed—100 acres
Well pattern—five-spot (440 ft. by 440 ft.)
First injection—January 1950
First increase—March 1950
Status—Active
Gravity—35.2° A.P.I.
Viscosity Saybolt Universal—44 sec. at 100° F.

OIL PRODUCTION BY YEARS (BARRELS)

1906	6,608	1917	11,039	1928	2,768	1939	6,443
1907	145,088	1918	8,107	1929	2,543	1940	6,906
1908	109,358	1919	6,570	1930	2,194	1941	7,234
1909	37,955	1920	6,939	1931	1,487	1942	8,154
1910	32,301	1921	7,480	1932	†3,841	1943	8,776
1911	15,547	1922	4,583	1933	5,671	1944	8,336
1912	15,798	1923	4,082	1934	6,729	1945	10,003
1913	12,589	1924	4,857	1935	6,045	1946	14,957
1914	9,206	1925	4,379	1936	5,874	1947	15,043
1915	*11,394	1926	4,068	1937	7,854	1948	14,438
1916	10,463	1927	3,137	1938	6,588	1949	10,824
						1950	‡6,053

Production before flooding	637,164 bbl.
Production per acre before flooding	6,372 bbl.
Total production through June 30, 1950	643,217 bbl.

*Vacuum applied. †Repressuring started. ‡Six months' production.

SUMMARY OF WATER-FLOOD PERFORMANCE

Date—	Acres flooded	Injection wells	Oil wells	Cumulative oil production bbl. per acre	Cumulative water-oil ratio
December 31, 1949	80	*28	16	..	..
June 30, 1950	100	*32	16	47	74

Water injected through June 30, 1950	348,120 bbl.
Oil produced during flooding through June 30, 1950	4,716 bbl.

*Includes jointly owned line wells. H. C. Weber interest 4½ wells; Van Dall Bros. interest 3¾ wells; Forest Oil Corp. interest 1¼ wells.

MONTHLY RECORD OF WATER INJECTED AND OIL PRODUCED

	Water injected* (bbl.)	Oil produced (bbl.)
January	22,920	.....
February	28,942	.....
March	64,531	746
April	74,793	858
May	74,508	1,173
June	82,426	1,939
Total	348,120	4,716

*Includes all water injected into inside input wells and Sunray Oil Corp.'s proportionate share of water injected into line wells.

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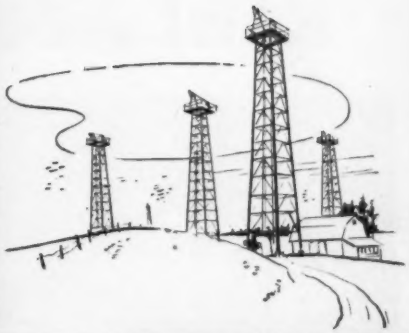

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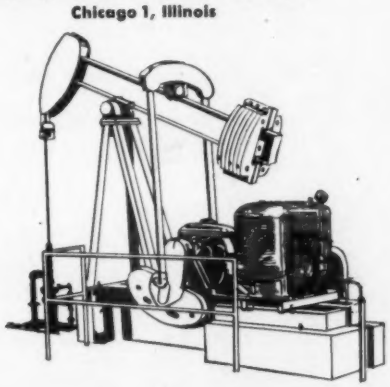

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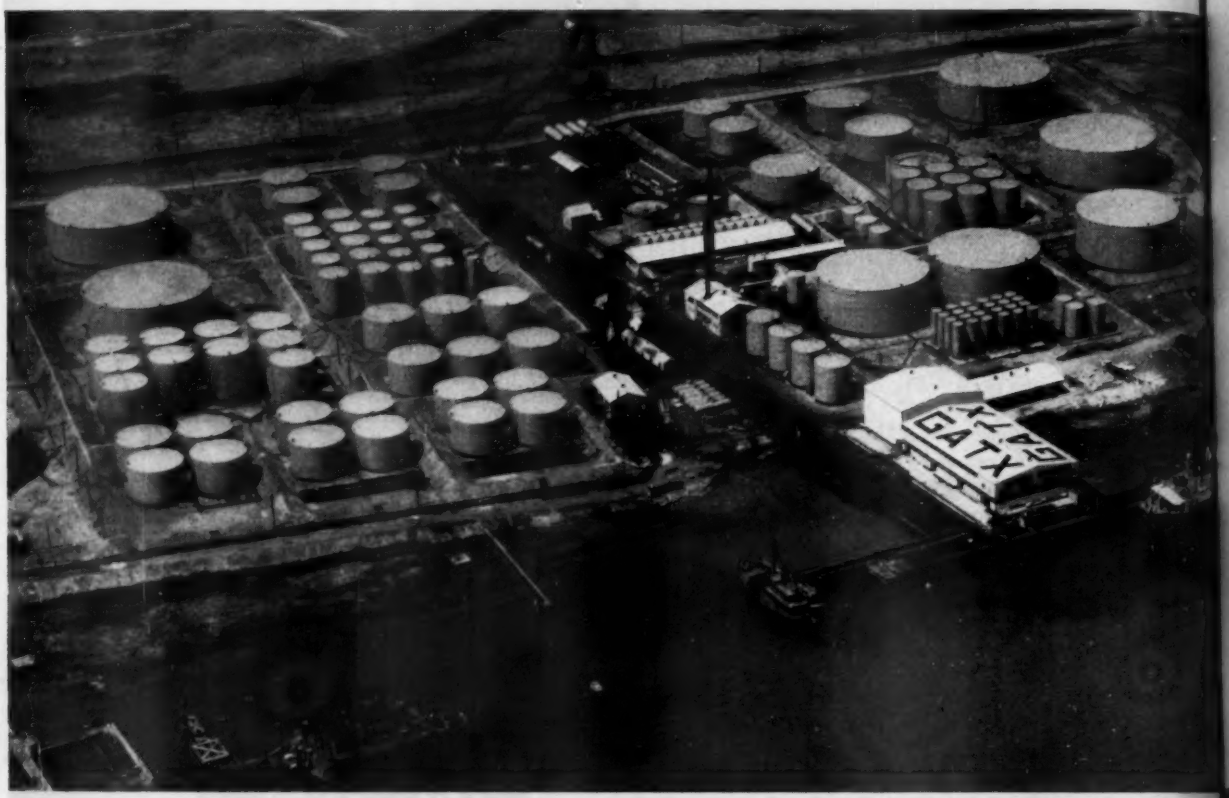

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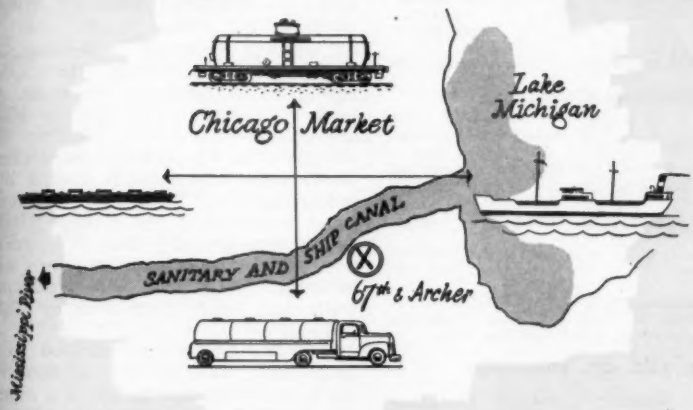

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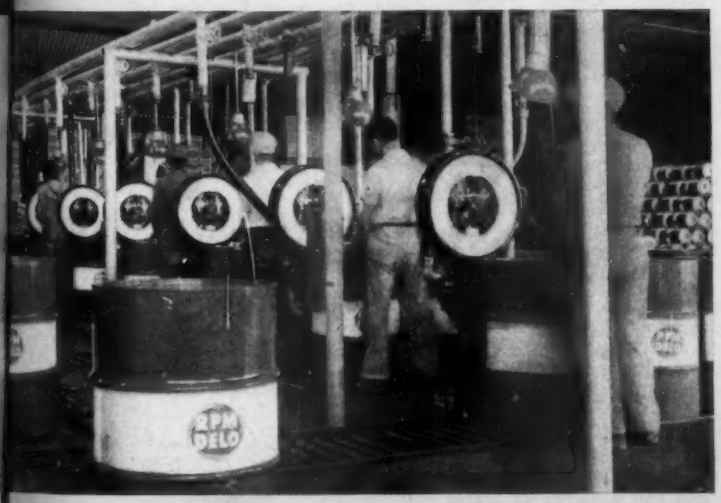

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TABLE 5—SUMMARY OF OPERATIONS, FOREST OIL CORP. PROJECT 28, WEBER POOL, WASHINGTON COUNTY, OKLAHOMA

Location—Sections 27, 28, and 34-27n-13e
Sand flooded—Bartlesville
Top of Sand—1,250 ft.
Effective sand thickness—28 ft.
Productive area—575 acres
Area developed—87 acres
Well pattern—five-spot (660 ft. by 660 ft.)
First injection—April 1949
First increase—August 1949
Status—Active
Gravity—37.6° A.P.I.
Formation—Temperature 88° F.
Viscosity Saybolt Universal—44.7 sec. at 88° F.

OIL PRODUCTION BY YEARS (BARRELS) (575 ACRES)

1905	23,798	1917	52,068	1929	22,141	1941	45,059
1906	558,540	1918	41,420	1930	27,232	1942	41,671
1907	598,396	1919	39,646	1931	30,727	1943	38,563
1908	441,806	1920	39,962	1932	45,070	1944	35,760
1909	203,101	1921	36,510	1933	44,122	1945	32,711
1910	158,667	1922	32,415	1934	51,152	1946	30,266
1911	89,965	1923	23,729	1935	57,258	1947	31,899
1912	64,100	1924	27,073	1936	56,828	1948	30,217
1913	49,741	1925	23,407	1937	50,139	1949	‡37,217
1914	*57,335	1926	22,746	1938	43,251	1950	§54,906
1915	57,625	1927	20,530	1939	44,119		
1916	55,569	1928	†22,650	1940	45,578		

Production before flooding (575 acres)	3,561,650 bbl.
Production per acre before flooding (575 acres)	6,194 bbl.
Total production through April 30, 1950 (575 acres)	3,616,556 bbl.

*Vacuum applied. †Repressuring started. ‡Water flooding started. §Six months' production.

SUMMARY OF WATER-FLOOD PERFORMANCE

Date—	Acres flooded	Injection wells	Active oil wells‡	Cumulative oil production bbl. per acre§	Cumulative water-oil ratio§
December 31, 1949	17	*10	8	419	77
June 30, 1950	105	†27	22	222	63

Water injected through June 30, 1950	1,478,378 bbl.
Oil gained by water flooding through June 30, 1950	30,411 bbl.

*Jointly owned line wells. Keener Oil & Gas Co. interest 4¾ wells. †Includes jointly owned wells. Keener Oil & Gas interest 4¾ wells, Sunray Oil Corp. 1¼ wells. ‡Includes all active oil wells within flooded area. §Based on oil gained by water flooding only.

MONTHLY RECORD OF WATER INJECTED AND OIL PRODUCED

	Water injected* (bbl.)	Total production† (bbl.)	Estimated water-flood oil (bbl.)	Water injected* (bbl.)	Total production† (bbl.)	Estimated water-flood oil (bbl.)
January	.....	.....	.....	46,501	5,822	3,115
February	.....	.....	.....	44,247	5,688	2,727
March	.....	.....	.....	54,202	6,118	4,532
April	48,598	.....	.....	†249,078	5,434	4,073
May	65,988	.....	.....	264,944	5,983	4,363
June	63,306	.....	.....	271,738	5,712	4,475
July	59,406	.....	.....	.....	.....	.....
August	65,971	3,604	897	.....	.....	.....
September	61,813	3,389	845	.....	.....	.....
October	64,317	4,045	1,269	.....	.....	.....
November	57,303	4,878	2,029	.....	.....	.....
December	60,966	4,233	2,086	.....	.....	.....
Total	547,668	20,149	7,126	930,710	34,757	23,285

*Includes all water injected into inside input wells and Forest Oil Corp.'s proportionate share of water injected into line wells. †From 575 acres. ‡Forest Oil Corp.'s water-pressure plant started.

on the lease. From the pond, the water passes through an accelator treating tank, where lime and alum are added. The water is filtered through an open sand filter into a clear well, from which it is pumped into the supply lines. The water is injected by an electrically driven 3 by 4 by 7½-in., two-stage centrifugal pump. The water is distributed to the input wells by a main and lateral line system. A meter, a pressure gage, and a control valve are located at the well head of each input well.

Water injection into 10 of the inside input wells was started in April, and by July 1, 1950, water was being injected in 14 input wells. Oil wells adjacent to the Keener water-flooding project are being pumped, but tentative plans are to convert the entire project to flowing as soon as adequate pressure is available.

The production history of the flooded properties, with particular attention to the water-flooding operations, are summarized in Table 5. The table includes the volume of oil produced each year from 1905 to 1950, inclusive, from 575 productive acres, performance data, and the volumes of water injected and oil produced monthly from April 1949 through June 1950.

It should be noted that the number of injection wells listed in Table 5 includes line wells drilled in cooperation with Keener and Sunray, although the volume of water injected listed includes only Forest's proportionate interest in the water going into these well. Although there are numerous old wells on the property that will be affected, many of them were inactive July 1, 1950. The table shows the number of oil wells affected.

Development of this project is only about one-third completed. Eventually the entire productive area on the 575-acre tract will be developed on a regular 10-acre five-spot pattern. Water has been injected at an appreciable rate only during the past 3 months, so there has been little opportunity for it to affect the rate of production. The results being obtained on the Keener project should be indicative of the results that may be expected on this project, as it almost surrounds the Keener flood.

Winona Oil Corp.—This company began development for water flooding on an 80-acre tract in 4-26n-13e, near the southern limit of Weber pool, in May 1950.

Tentative plans are to develop the lease on a five-spot plan with a spacing of 660 ft. between like wells. As none of the old wells on the lease are suitable for water flooding, the development will require the drilling of 15 water-input wells and 8 oil-producing wells. Twelve of the water-input wells are to be drilled jointly on common property lines in cooperation with offset operators. Seven water-input wells and two producing wells had been completed by July 1, 1950.

A water-supply well drilled to a total depth of 1,865 ft. reached the top of the Arbuckle group at a depth of 1,790 ft. This section from 1,790 to 1,865 ft. is a dolomitic limestone and has been acidized with 1,100 gal. of acid. The well has not been tested, and it is not known whether it will produce enough water for the proposed flood. The well is to be deep-

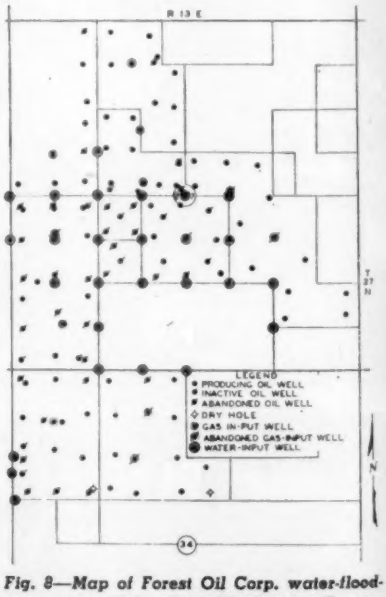

Fig. 8—Map of Forest Oil Corp. water-flooding project, Weber Pool, Washington County, Oklahoma.

ened to the Roubidoux sand if testing indicates an inadequate water supply.

A water-pressure plant, using a closed system, is under construction. A 100-hp. electric motor and a 3 by 6-in. vertical triplex pump are being installed in the pressure plant. Plans include a water-pressure manifold with individual cement-lined distribution lines to each water-input well.

The water-input wells are completed with 20 to 60 ft. of 10-in. surface casing and a string of 2-in. cement-lined tubing, which is set on a packer and cemented at the top of the Bartlesville oil sand. In addition to the surface casing, the producing wells are completed with a string of 7-in. casing set and cemented at the top of the oil sand. All wells drilled to date have been cored and shot with nitroglycerin.

The producing wells are to be equipped with individual electrically driven pumping units. The oil-gathering system will consist of individual cement-lined lead lines connected to a manifold adjacent to centrally located stock tanks. Individual well tests will be possible with this arrangement.

Hoyt Oil Co.—This water-flooding project is located immediately north of the Winona project and consists of 80 acres in 4-26n-13e.

Development of this property was begun in June 1950, when two water-input wells were drilled in accordance with a line agreement with Winona Oil Corp. The tract is to be developed on a five-spot plan with a spacing of 660 ft. between like wells. Line agreements have been effected with offset operators for drilling and operating 12 water-input wells along common property lines. The old oil wells on the property are to be used insofar as possible, and new producing wells are to be drilled as needed to complete the pattern.

Water for flooding is to be purchased from Winona Oil Corp. until a supply well is drilled and a water-pressure plant constructed.

BOOKS

WATER FLOODING IN PENNSYLVANIA. By Charles R. Fettke. Published by Pennsylvania Department of Internal Affairs, Harrisburg.

This is a reprint from Secondary Recovery in the United States, second edition, published by American Petroleum Institute. It relates the history and techniques of artificial water flooding in the oil fields of Pennsylvania.

TENTATIVE STANDARD PROCEDURE FOR THE DETERMINATION OF CARBON DIOXIDE AND OXYGEN IN NATURAL GAS. Published by the California Natural Gasoline Association, 510 West Sixth Street, Los Angeles. $2 to members, $2.50 to nonmembers.

This bulletin is intended as an operating manual for the analyst in the laboratory and in the field. Included are the test procedures for laboratory and field determinations.

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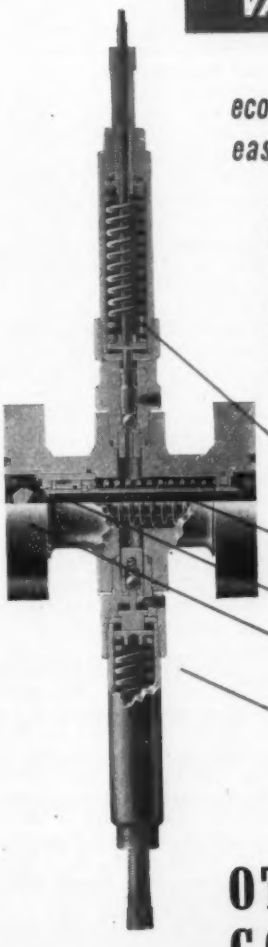

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Losing Circulation? Here's a timely discussion on

Lost-Circulation Materials and Mud Additives

by Roy F. Carlson
West Texas District Editor

Lightening the cement slurry, use of bridging materials, high-gel cements, and mud additives are among measures taken in West Texas fields to combat lost circulation

WEST TEXAS in a number of areas is conceded by operators to be a nightmare of drilling problems, and one of the foremost of these is lost circulation. The materials used to regain circulation or to prevent its loss are numerous. Discussion on a few of the new materials, and the newer applications of known mud additives, both in mud and in cementing practices, follows.

Most of the wells drilled in the Permian basin, particularly the deeper ones, encounter formations that will "thief" mud or cement either because of high porosity initially or because of incompetency. In some areas such as Dollarhide field, porosity reaches cavernous proportions—to an extent that drill pipe will drop freely for several feet.

This problem is multiplied and complicated by extreme depths in many wells which require that long cement columns be put into place behind long casing strings, or that several casing strings be run—the latter an extremely expensive operation. If formations through which this cement is to be placed are incapable of withstanding high pressures, along with having some degree of permeability, some cement or mud is almost invariably lost.

Lightening Cement

One of the obvious answers to losing returns in cementing, particularly where formations will not withstand high hydrostatic heads, is to lighten the cement slurry, and this is being tried with varied success.

In order to lighten the cement appreciably it is necessary to add a material that will replace some of the cement volume, and at the same time have a lower specific gravity. Several materials have been used to accomplish this, among them being gel-forming materials of the bentonite nature, and the recently introduced angular, granular bridging materials. For the latter, reference is made to expanded-perlite products, available in several different-sized particles, and weighing about 2 lb. per gallon. One of these products is marketed under the name of Wellite. Many kinds of bulk materials have been also used. The bridging material has the advantage of being a lost-circulation agent along with its lightening effect, and so tends to plug some of the existing porosity if the formation begins to take cement.

Bridging Materials

When bridging materials are used in cement, their use is restricted to the incompetent zone, and whatever column of cement there is above it. Ordinary gel or neat cement is used below the lost-circulation point. Most operators when cementing casing strings apparently want to tie in the casing shoe with a batch of neat cement, holding that this procedure will provide a better anchor for the casing shoe.

The theory behind the use of bridging materials in either mud or cement, as a lost-circulation cure, is that due to their angularity and a varied assortment of sizes of particles, they will penetrate a porous formation until they find an opening smaller than the particle, where it will lodge due to a pressure differential across the particle. As long as there is any flow past or around the particle more and more particles will be deposited until a dam is built up within the formation, blocking further fluid passage.

Another characteristic of the bridging materials, particularly those manufactured from the perlites, is a scavenging or scouring action on the sides of the hole. In this instance, the particles function to rasp the filter cake from the walls of the hole, providing a good bonding surface for the cement slurry. Evidence of this scouring action is given in some wells where the cement has been circulated to the surface. It is usually preceded into the cellar by a large quantity of extremely high viscosity mud that is "clabbered up," due, probably, to filter cake taken from the walls of the hole.

The cement-gel-bridging material mixture is usually mixed in a bulk plant, although the mixture can be prepared at the well. Quantities of gel are the aforementioned 5 per cent by weight, based on the cement, and the bridging materials are usually mixed in quantities of 50 per cent by volume. The quantity of bridging material varies widely, particularly in a downward direction, although much higher percentages have been pumped.

The 50 per cent mixture of gel, bridging material, and cement has the appearance, when mixed, of a neat cement weighing 14.5 lb. per gallon, a feature that is sometimes confusing to field personnel. However, this mixture when prepared in slurry form has an actual weight of 11.5 lb. per gallon. Doubling the cement-bridging material ratio gives a slurry of 10.6 lb. per gallon.

Volumes of the lightened material are calculated to span the incompetent zone and reach above it as far as is necessary, either to the surface, or into the next larger string of pipe.

High-Gel Cements

The high-gel cements mentioned have received considerable investigation, are in some use, and are the subject of much attention in West Texas. Cements made from slurries of the 12 per cent gel mixture are very light in weight—on the order of 13 lb. per gallon. Although the gel itself is light in weight compared to the cement, a large reduction in weight is derived from the large quantity of water that is added to wet the gel to make the slurry pumpable.

These slurries are mixed with a small quantity of a dispersing agent (less than 1 per cent) in order to hold viscosity to a pumpable level. The dispersing agents, of two or more varieties, are used in very low percentages. The percentages used in these modified cements are rather critical.

In addition to weight reduction the high-gel cements have the added advantage of being better suited to perforating, since either guns or jets will penetrate these cements better than neat cement. Also, the penetration is accomplished without fracturing the cement too badly, a distinct advantage where communication between zones is possible, where they

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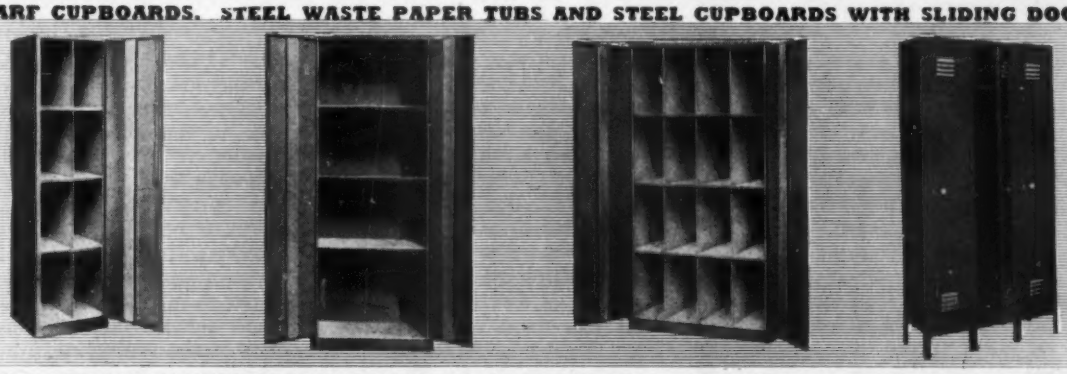

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are not widely separated, and where perforations are shot with a high density.

The high-gel cements hold the mixing water in the slurry all during the setting and curing process, even under pressure. This is indicated by the observation of cured volumes being very close to mixed-slurry volumes. This in turn indicates that with these cements, little or no segregation of cement and water will occur, forestalling the possibility of predehydration of the cement. The high gel content does, however, reduce the compressive strength of the cement, but this factor is not too important, especially where the casing is set through the producing horizon and later perforated.

Mud Additives

Another newcomer to the field of lost circulation in West Texas is one of the oil-base mud additives. This material, made from asphalt, sodium silicate, and other substances, has been used in slugs in water or water-base mud to stop loss of returns in several instances. This agent is normally rather viscous and has the appearance of a black oil. When mixed with fresh water, however, it forms a very thick viscous, jelly-like substance designed to produce a sealing effect and will withstand moderate pressures.

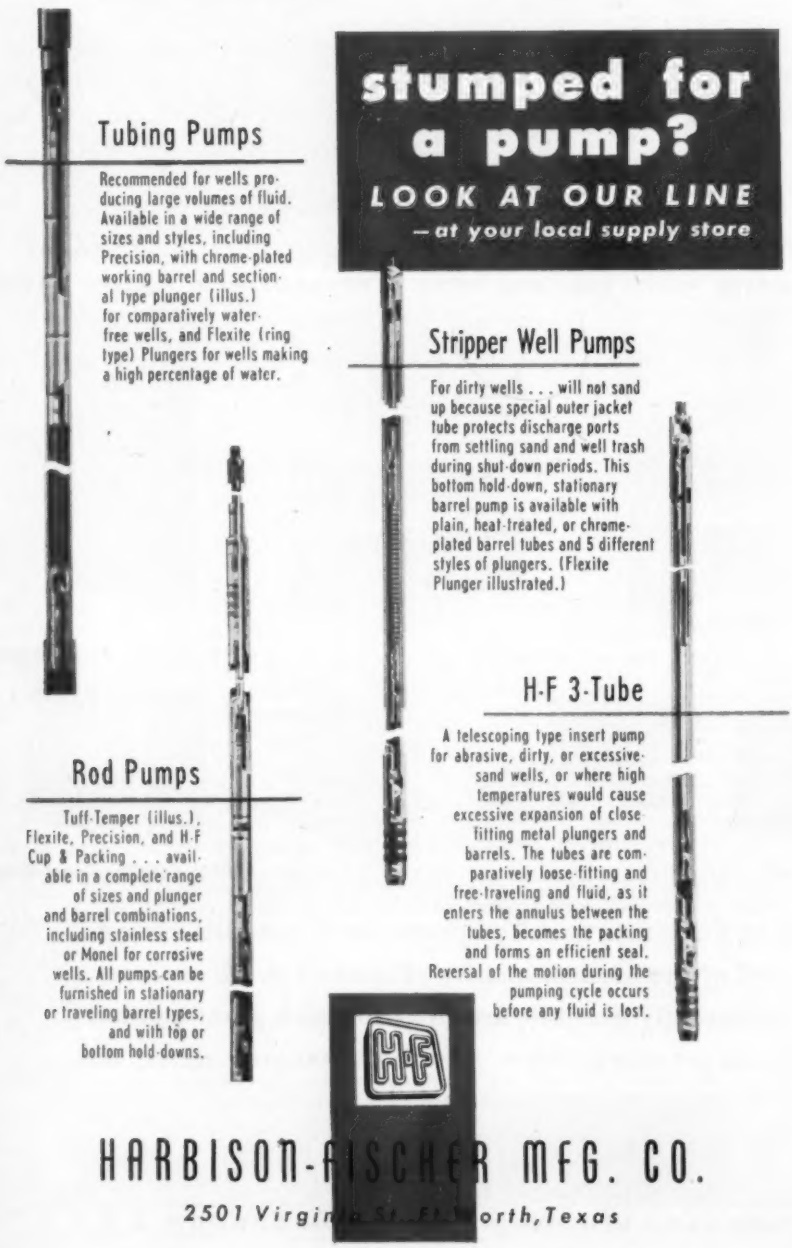
When used to combat lost returns, the additive is pumped with as little mixing as possible down the drill pipe in a slug and into the annulus to where the mud is being lost. The material seems to diffuse into existing porosity, mixing with water from the mud. It forms the very viscous dispersion mentioned, sealing off porosity. The viscous substance formed by the water and oil-base mud material is actually a water-in-oil emulsion, small droplets of water being dispersed in a continuous phase of oil. Addition of water causes it to thicken both by increasing the number and size of the emulsified water droplets.

It would seem that this material would not be capable of plugging any large degree of porosity, but it is apparently effective against some formations. The full possibilities of the material have not been explored, it being so new in this application, but it holds promise as a carrying agent for some of the existing lost-circulation materials, both of the bulk or plastering type and the bridging materials, particularly where high viscosity is needed to keep the material in suspension.

Another of the newer lost-circulation materials that is added to mud is the bridging material, previously described as being added to cements. Use of these materials in the mud system is very different from the common uses of lost-circulation materials. These materials, since they are relatively friable are used in a "single shot" method, rather than being added to the entire mud stream. In this manner, the material makes only one trip through the pumps, the drill pipe, and the bit, and is not pulverized in the process.

Procedure in using the method calls for picking up a heavy concentration of the material in a slug in the mud stream, pumping it into the well, and spotting the slug across the zone where mud is being lost. As the mud goes into the formation, it carries particles of the bridging agent with it and builds up an impermeable barrier in the formation. This barrier, after being built up in the formation, is set into position if possible by applying high pump pressure at the surface after shutting in the mud stream. The pressure used is chosen to be higher than any expected during the drilling and completing operation in the well. Circulation and drilling operations are then carried on normally.

Since these bridging materials are very light, they will tend to float up the mud column. Therefore to keep the materials in place in the mud stream, they are carried in a slug of mud with a viscosity of not less than 40. Often it is carried into position in a slug of oil-emulsion mud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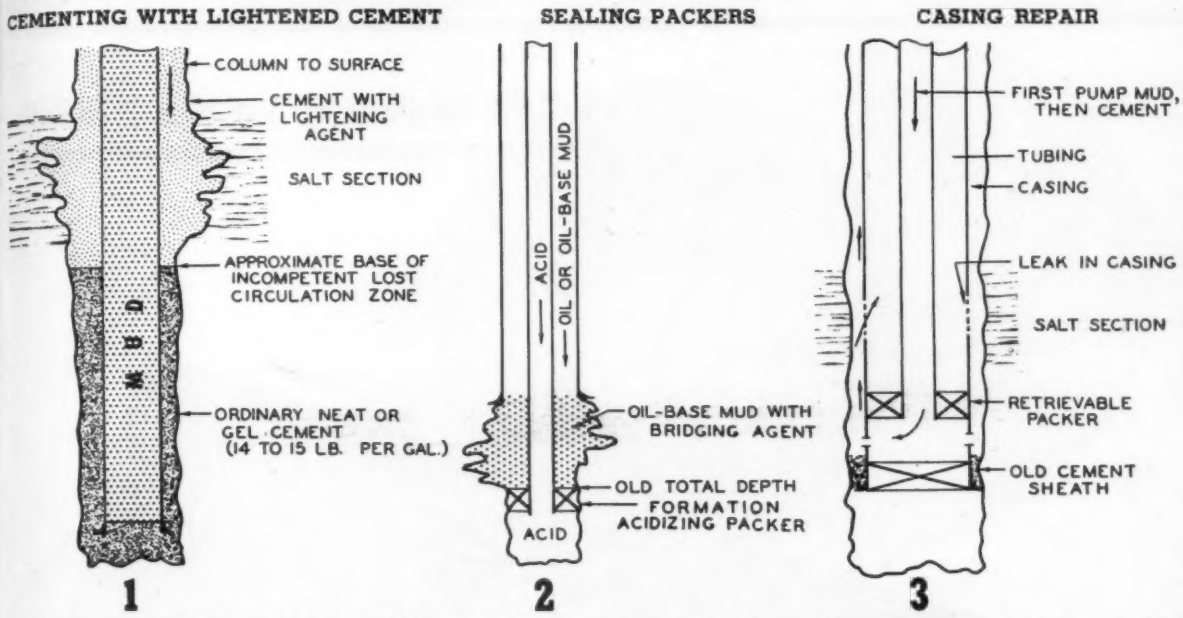

1. The drawing illustrates typical lightened-cement cementing practice which is sometimes used where a salt section or other lost-circulation formation is involved, as it is in most of West Texas. The shoe is set in neat cement. Upon occasion, where it is desired to deepen a well through a low-pressure pay on top of which casing has already been cemented, a batch of cement mixed with a bridging agent is spotted on bottom and later drilled out, or the drilling is sometimes carried out using a mud loaded with a lost-circulation agent and reverse circulating.

2. Bridging agents are sometimes employed in attempts to seal production or acidizing packers and to prevent fouling any producing zone that is exposed to the mud pressures necessary to keep the packer in the hole. If the well is deepened before acidizing, the bridging agents are sometimes used while drilling to prevent fouling of the exposed formation. In acidizing the bridging agent helps seal the packer and aids in maintaining a pressure balance across the packer so that the packer will not be acidized loose.

3. In many old wells in West Texas casing was placed into position with a very small amount of cement. In these wells a long expanse of pipe was left exposed to a salt section which has corroded the pipe badly, often necessitating squeeze cementing of the casing above the old cement. A general method of repairing such leaks is as follows: Returns are established through the casing, the casing is then shut in and returns are established up the outside of the pipe. When returns are established, a cement slurry containing a bridging agent is squeezed up around the casing past the leaking section. All during this operation the casing must be full of mud. The fluid column must be kept balanced in this case since the retrievable retainer is removed upon completion of the job. Lightness of cement slurry simplifies this operation, and inclusion of bridging agent in slurry tends to reduce channeling. Squeezing operations with cement-bridging agent mixture require two half-inch holes per pump truck.

material so that better control of carrying-agent properties may be obtained. Where a heavy concentration of these bridging materials has been needed, the slugs have been mixed in two to one concentrations, and viscosities of mud raised from one of 55 to an apparent viscosity of 700, while lowering the measured weight of the mud from 9.9 to 5.5 lb. per gallon.

Setting Production Packers

One of the newer uses that have been developed for the angular bridging materials is as a sealing agent around production packers for use in gas-oil-ratio control or similar applications. If resetting of a packer is necessary, the packer should be pulled to determine the manner of leakage—whether around the packer, or through fractures in the formation in which the packer is set.

If the leakage is taking place around the packer itself, a slug of the bridging material is mixed with oil-base mud or crude that has been treated with commercial lime to raise its viscosity. The mix is in a ratio of 2 cu. ft. of bridging agent to 1 bbl. of carrying agent. If leakage is through the surrounding formation, the carrying agent is water-base mud of sufficient viscosity to carry the material, mixed in the same proportions as above. The total mix uses from three to five sacks of bridging agent, or about 2 or 3 bbl. of the carrying agent. A fine grade of the bridging material is used.

There are three primary methods of spotting the mixed slug around or at the packer. (1) It can be pumped down the casing when the annulus does not contain fluid, with a small oil load behind the slug. (2) It can be spotted through a side-door choke. (3) It can be spotted through the tubing, prior to setting the packer. In all cases, the operation should be carried out rapidly, since the lightness of the bridging agent tends to float the slug which should be held in place around the packer by building up a pressure differential across it. When this pressure is released, the material should float away from the packer, removing any tendency to hold up or stick in the hole when the packer is pulled or moved.

Another use of the bridging material is to plug porosity in acidized zones, either in preparation for abandoning those zones, for acidizing some other less-permeable zone, or a combination of these. In this case, the bridging agent is mixed with a viscous oil or oil-base mud. The slug technique is again used here, and the material is squeezed into place in the formation. For this kind of squeezing, and for squeezing cement through perforations, the bridging agent is added in proportions of from 10 to 33 per cent by volume. The same general practice is followed when cementing liners through a porous formation, abandoned pays, or zones that are to be protected from too much cement entry.

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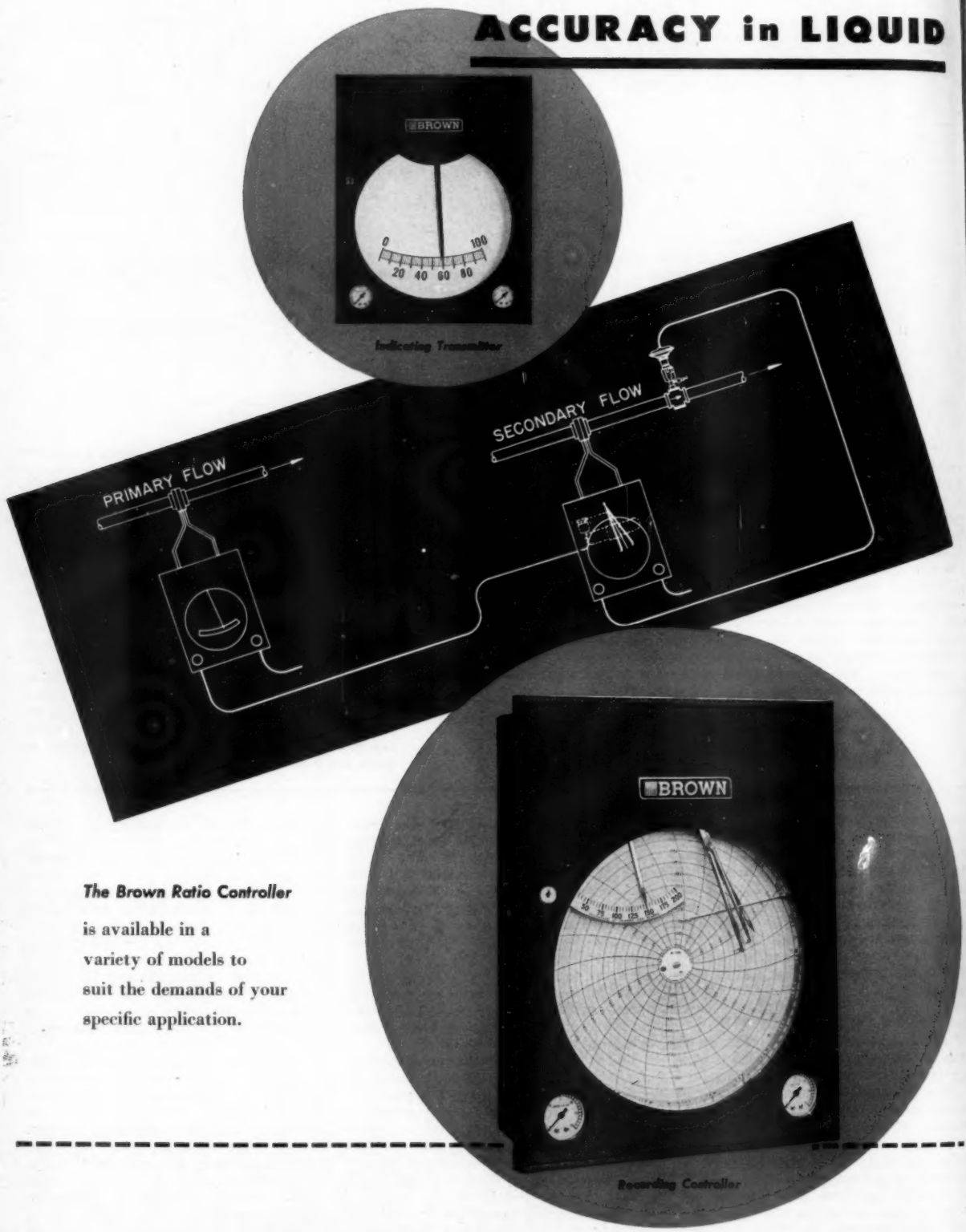

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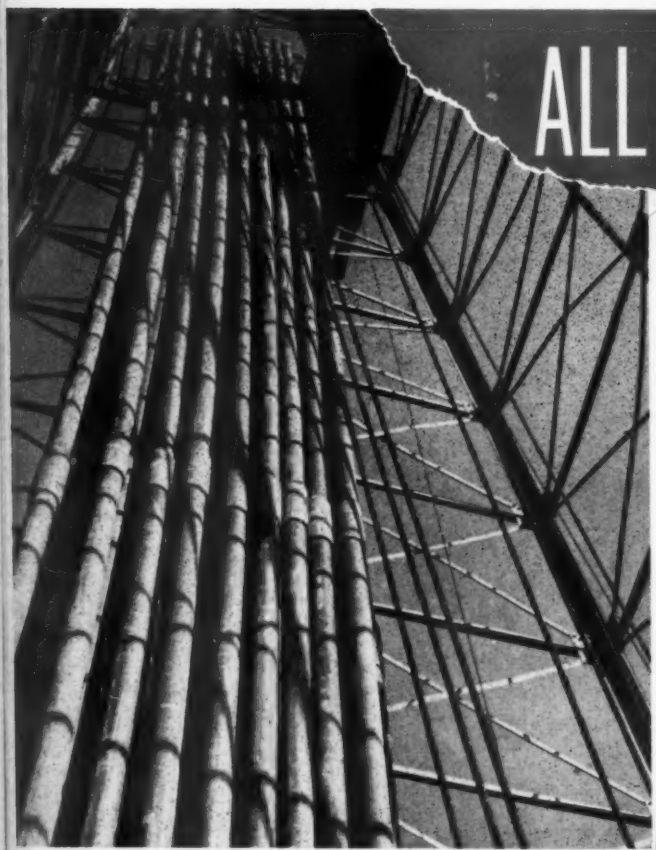

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All drill pipe is seamless because only seamless has the great strength necessary to withstand the tremendous stress of drilling. But don't stop with drill pipe. Use seamless casing and tubing, too; give *all* your tubular products the advantages of seamless construction: uniform wall strength, tough joints, high collapse resistance.

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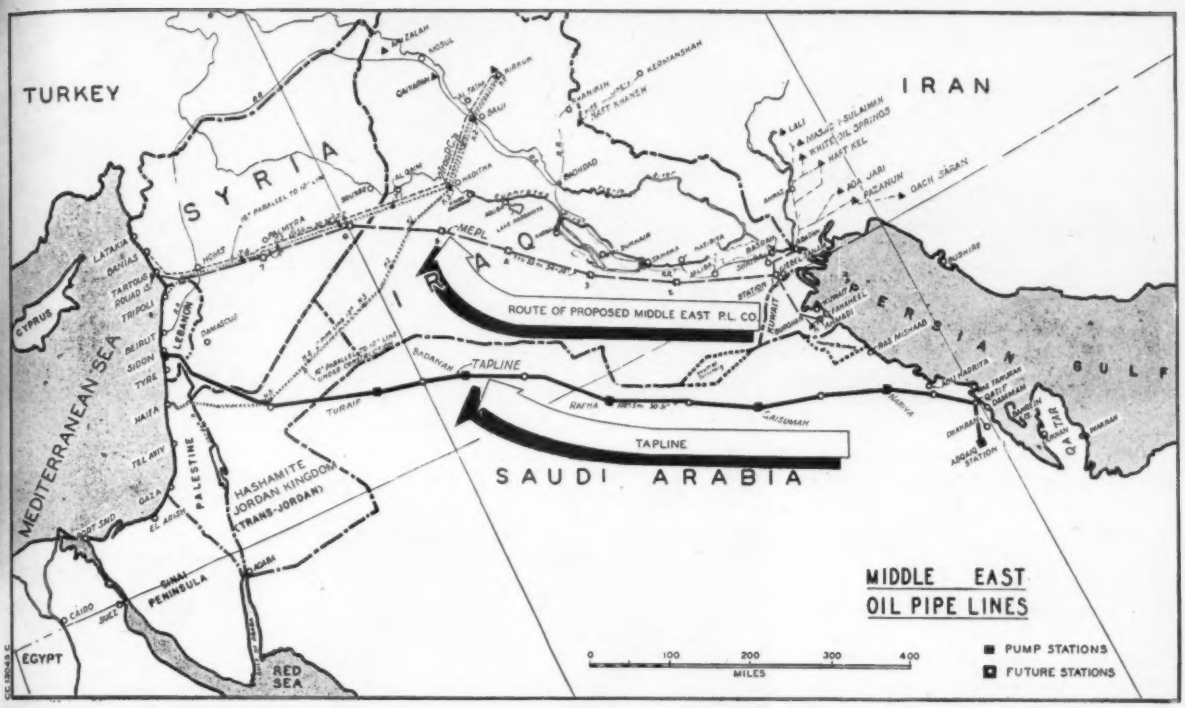
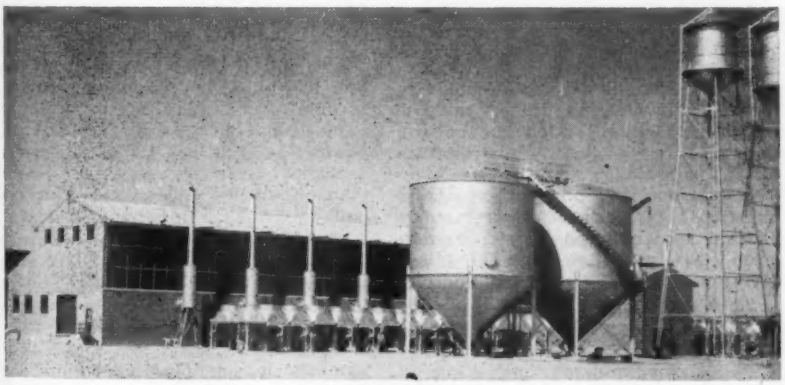
UNITED STATES STEEL



Map showing routes of existing and planned crude-oil pipe-line facilities in the Middle East. Ownership and operation of the Trans-Arabian pipe-line system (Tapline) have been divided so that Arabian American Oil Co. has the 315-mile eastern section from Abqaiq to tanks at Qaisumah; and Trans-Arabian Pipe Line Co. has the western section including the Qaisumah station and extending 753 miles to the Sidon terminal.

Tapline's



Pump station, air coolers, and tanks at Qaisumah.

PUMP STATIONS

Pump stations under construction were visited by the author in a trip this year over the system built by Trans-Arabian Pipe Line Co. which is owned by The Texas Co., Standard Oil Co. of California, Standard Oil Co. (N.J.), and Socony-Vacuum Oil Co., Inc. This is the fourth and final article of a series.

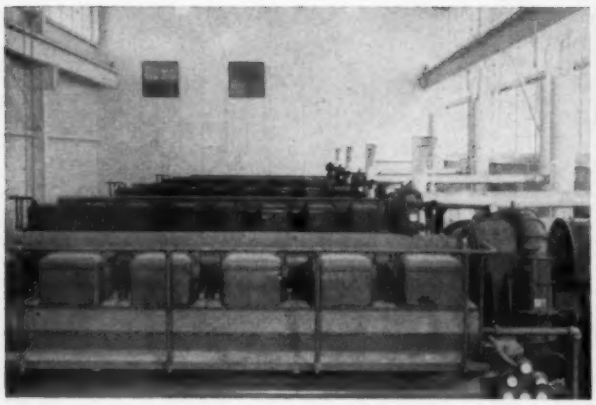
by Paul Reed
Pipe-Line Editor

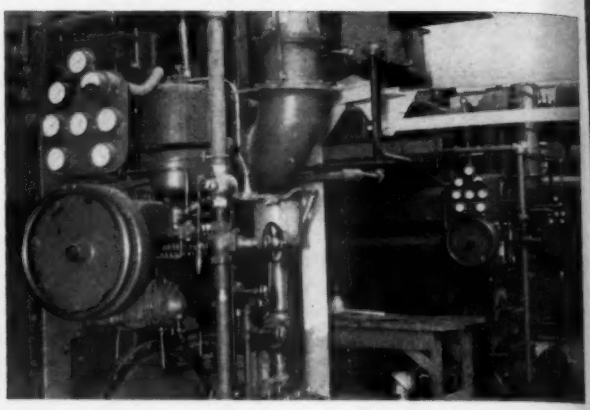
THE six pump stations for the initial program of the Trans-Arabian system consist of one steam-turbine centrifugal station and five diesel centrifugal stations. These are equipped for transporting a full load of 315,000 bbl. daily through the 1,068-mile, 30 and 31-in. crude-oil line from Abqaiq field in Saudi Arabia, near the Persian Gulf, to Sidon, Lebanon, on the Mediterranean.

Two of the stations are located in the eastern 315 miles of this system which Arabian American Oil Co. owns and will operate. The other four stations are in the western 753-mile section which Trans-Arabian Pipe Line Co. owns and will operate. This article deals with the principal features of these six stations which have been carefully designed over a long period by the Trans-Arabian Pipe Line Co. organization.

The Aramco 315-mile section includes the Abqaiq and Nariya stations and is integrated with the Aramco field gathering system. The remaining 753-mile section of Tapline includes the pump stations at Qaisumah, Rafha, Badanah, and Turaif.

These six centrifugal pump stations under construction this year have a total of 53,040 prime-mover horsepower in pumping units. The Abqaiq station at the upstream end of the





Four of the five 1,710-hp. main diesel engines at Badanah station.

line has 12,000 hp. in steam turbines. This leaves 41,040 hp. at the remaining five diesel stations. Standby units at the six stations account for 14,550 hp. in these prime movers. In addition 19,800 hp. in diesel engines is connected with electric generator units.

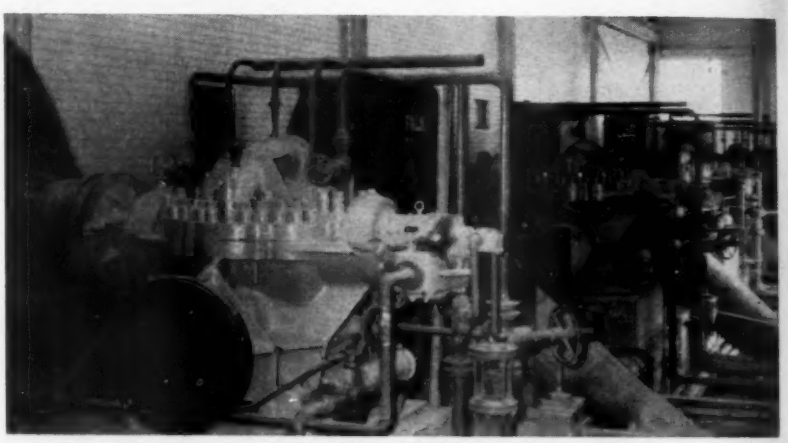
Notable features of the diesel stations are the unusually large electric generator facilities, the big air coolers for engine jacket water, and the extensive use of motor-operated valves and remote and automatic controls.

Program for Station Design

Because of the unusual conditions existing along the remote desert route of the Trans-Arabian project, consideration was given to the possibilities of a wide variety of equipment. Engineers spent about 6 months studying various types of prime movers and pumps, including gas turbines with centrifugals, steam turbines with steam generators and centrifugals, electric motors with generating plants and centrifugals. They finally selected two types of station equipment: (1) diesel-engine-driven centrifugals which use stabilized raw crude oil from main line throughput were chosen for the four intermediate pump stations on Tapline's section and one of the intermediate stations on Aramco's section; (2) noncondensing steam turbines driving centrifugal pumps were chosen for installation at the initial station at Abqaiq since Aramco has an abundant supply of natural gas and a large steam-generating plant in Abqaiq field.

Expansion and Contraction of Crude Oil

The Trans-Arabian pipe line was designed to operate by the use of so-called "float tanks" because of conditions under which it will function. In the Trans-Arabian system an average of about 800,000 bbl. of oil will be moving constantly between each pump station and the next one west of it. Between Abqaiq and Turaif stations, 52 per cent of the main line is constructed aboveground where it is directly exposed to heat radiation from the sun; therefore it is sensitive to fluctuations in atmospheric temperature. Immediately following sunup or sundown and during thunder showers or other sudden atmospheric temperature changes, the temperature of oil in exposed sections of this large-diameter main line might fluctuate as much as 5° F. per hour. Consequently volumetric expansion (or contraction) might be as much as 2,000 bbl. between two adjacent pump stations.



Centrifugal pumps during construction at Badanah station.

The expansion in the circumference of the pipe up to its elastic limit will be negligible and inadequate to take care of this volumetric change. Pumping pressures at each station will be maintained as nearly uniform as possible. Therefore, increases in the rate of flow due to volumetric increases by temperature rises must be relieved through regulating valves into float tanks. There is one of these at each of the intermediate pump stations, except Qaisumah. At Qaisumah one of Aramco's delivery tanks will provide this relief. At stations where volumetric discharge at normal operating pressure is decreasing because of falling temperature ahead of it, the deficiency will be made up by taking suction on the float tank at this station.

Turbines and Engines

The initial station at Abqaiq has two 6,000-bbl. noncondensing steam-turbine units operating at 3,600 to 3,960 r.p.m. for driving a centrifugal pump. Each unit has 415,000 bbl. daily capacity. Aramco's adjacent power plant furnishes 625-lb. steam delivered to the turbine at 750° F.

Aramco's Nariya station and Tapline's Qaisumah, Rafha, and Badanah stations are each provided with five 1,710-hp. diesel engines direct connected through speed increasers to centrifugal pumps. Tapline's Turaif station has only four of these pumping units. In each instance the units are connected in series. Normally when operating at full load of 315,000 bbl. per day, one unit will always be idle and available as a spare when some other unit may be down for overhaul or repair.

Each main-line pump is driven by a 1,710-hp. diesel engine (16-in. bore and 20-in. stroke) operating within 280-375-r.p.m. range. Normal engine speed of 343 r.p.m. is stepped up to 2,200 r.p.m. for driving centrifugal pumps. Engines and pumps are separated by a brick firewall. The pump

Strainers, motor-operated valves, and tank at Badanah.

Camels being watered in pit near Badanah station. After this pit dried up, full dependence was placed on camel trough served by station wells. During July, Tapline supplied water gratis to 150,000 camels and twice as many sheep and goats in six localities where 100,000 or more bedouins established summer camps along the pipe-line route.

room can only be reached through outside entrances.

In addition to the main-line pumps at each station there are electric-driven booster pumps to provide adequate suction pressure for the main pumping units.

Electric power at each station is furnished by three units rated at 1,320 - hp., six - cylinder, 360 - r.p.m. diesel engines, each driving a 1,000-kva. generator. These engines have cylinders of the same size as the pumping engines.

Approximately 60 per cent of the electric power demand will be for: (1) operation of air-fan radiation-type coolers for engine jacket water; (2) driving booster pumps to provide adequate suction pressure for main-line pumps. The remaining 40 per cent of the demand will be for camp lighting, air conditioning, refrigeration, domestic appliances, etc.

Abqaiq station receives its oil from an adjacent group of 180,000-bbl. storage tanks and delivers through Nariya to another group of six 180,000-bbl. storage tanks at Qaisumah. Nariya, Rafha, Badanah, and Turaif each have one 96,000-bbl. equalizing or float tank.

After passing the main gate valve at the incoming scraper trap, the flow is normally through two strainers in parallel; each strainer has two motor-operated valves. At pump stations all important valves are motor operated. Pneumatic opening and closing is being provided for intermediate valves which could also be manipulated by hand. Average opening or closing takes 4.6 minutes.

A pilot-operated relief valve, on the suction side of all diesel-engine-powered stations, relieves into tankage when suction pressure is in excess of 40 psi. The relief valve also has a level arm for manual operation and testing. By protective devices one or more units are shut down in series in the event discharge pressure on the outbound line exceeds prescribed maximum pressure.

Adequate suction pressure is maintained by the two centrifugal tank booster pumps operating in parallel. A third pump is a standby. Each pump is driven by a 200-hp., 2,300-volt electric motor. Suction pressure is recorded by a two-pen instrument.

Controls

Station discharge pressure is controlled by two air-operated diaphragm valves connected in parallel and operated as a unit. These valves are spring closed ("air to open"); they are controlled by pressure controller mounted on control board.

Outbound line pressures will be held below predetermined maximums as follows:

MAXIMUM DISCHARGE PRESSURE

Station—	Psi.
Nariya	928
Qaisumah	779
Rafha	789
Badanah	898
Turaif	617

The control system provides a convenient method for putting pump units in and out of service by having the operator gradually change the control-point setting; as a consequence, the outbound line pressure is changed. It also facilitates balancing pump speed and pump load without disturbing line hydraulics and outside line operation.

The two-pen recording feature of the pressure controller shows pressures on both sides of the control valves. The station suction pressure controller operates in series with discharge pressure controller when the system is being operated as a closed line.

Ultimate high-pressure protection of the line by shutting down the units is accomplished by a switch located downstream from control valve which shuts down units at pressures 30 psi. above predetermined maximum. High case-pressure switches in the three downstream units are set at 15 psi. below the high-pressure outbound line switch.

The contacts of the unit case-pressure switches are parallel. This parallel combination is in series with the contact of the high-pressure switch. The three unit case-pressure switches thus act as selectors, since normally only the downstream operating unit has its contacts closed. Then if excessive line pressures should close the high line-pressure switch, only the downstream unit would be closed. A subsequent shutdown of successive units would occur, proceeding from the downstream end of the series, only if individual pump-pressure selector switches close their contacts and only if the high line-pressure switch continues to be subjected to its limiting pressure.

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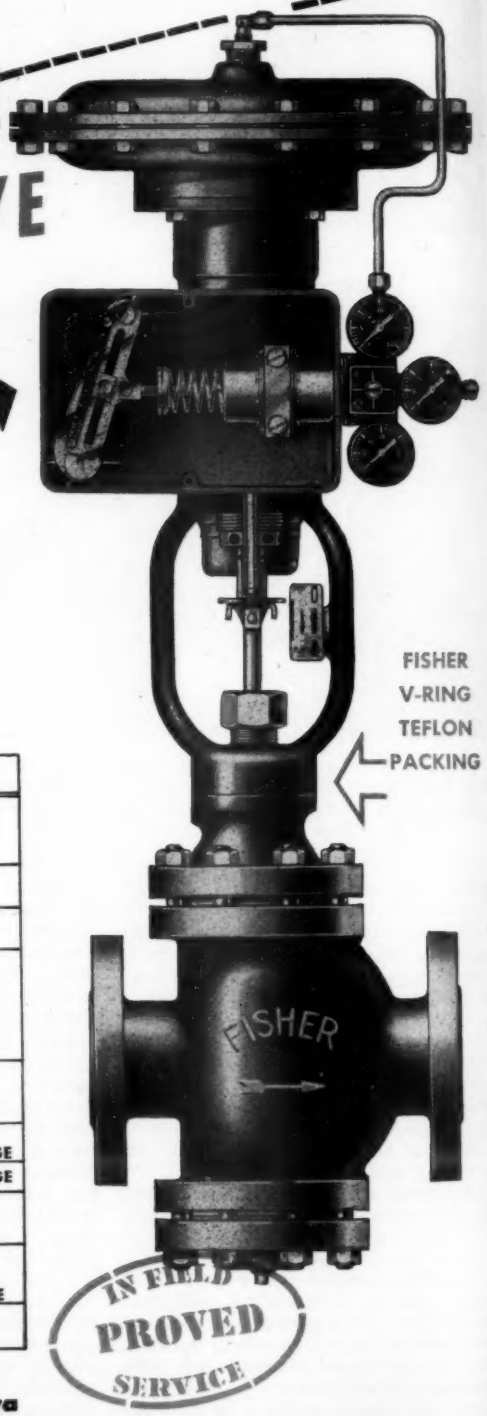
FOR ACCURATE POSITIVE VALVE POSITIONING



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Technical Data

TEST			FISHER TYPE 3500
INSTRUMENT PRESSURE SENSITIVITY CONTROLLING PRESSURE CHANGE NEEDED TO PRODUCE 2 LBS. TO 15 LBS. TO DIAPHRAGM			0.07 LB.
STEM MOVEMENT SENSITIVITY AMOUNT STEM CHANGE TO PRODUCE 2 LBS. TO 15 LBS. TO DIAPHRAGM	½" TRAVEL		0.0037" AVE.
	2" TRAVEL		0.015" AVE.
SPEED TIME IN SECONDS FOR FULL TRAVEL	SIZE	TRAVEL	
	DD	¾"	1.2 — 1.2 SEC.
	FF	1½"	4.2 TO 4.8 SEC.
	GG	2"	7.2 SPC TO 9.6 SEC.
	HH	2"	10.5 TO 12.6 SEC.
LAG ERROR IN POSITION AT 9 LBS. CONTROLLER PRESSURE	½" TRAVEL		0.0006" AVE.
	2" TRAVEL		0.001" AVE.
EFFECT OF VARIATIONS IN AIR SUPPLY PRESSURE	½" TRAVEL		0.1 LB. PER 5 LB. CHANGE
	2" TRAVEL		0.1 LB. PER 5 LB. CHANGE
CHARACTERISTICS CONTROLLED P VS DIAPHRAGM P			LINEAR
COMMENTS			STABLE ADJUSTMENTS ALL EASY AND SIMPLE
AIR CONSUMPTION NORMAL 9 LBS. DIAPHRAGM PRESSURE			15.0 CU FT/HR

FOR COMPLETE DETAILS WRITE FOR BULLETIN E-3500.

Fisher Governor Co., Marshalltown, Iowa

An orifice flow meter with recorder and integrator shows outgoing stream flow on the control board. Line temperatures of inbound and outbound streams are recorded on the switch board. From a central control board, the operator handles all the normal functions of the pumping units.

Control Board

The control panel board is provided with a control bench. Installed on the panel are:

1. Hydraulic instruments including pressure gages, controllers, recorders, and flow records.

2. Electric instruments including temperature recorders, clock, remote tank-level gages, and alarm lights.

3. Push buttons with indicating lights for controlling valves outside the pump room and for controlling suction booster pumps.

The electric section of the control panel is gas tight except for the front doors opening into the control room.

The bench section is built as a separate unit in front of the panel on which there are devices for operating the main pumps and valves on outgoing piping. The equipment on the electrical portions of the control board is of conventional design for operating in a nonhazardous atmosphere.

Push buttons and indicating lights are arranged in a simplified miniature diagram of station piping. This diagram is made of black anodized aluminum bars and symbols mounted on a light-gray baked-enamel board surface.

The control room is at the discharge end of the pump room at a slightly higher level than the pump room floor. A sealed window provides a view of the pump room. Louvers in the door to the engine room facilitate equalizing air pressures in control room and engine room. The pump room is ventilated by exhaust-fan units with intakes near the floor line. Atmospheric pressure in the control room and engine room is greater than that in the pump room by a ½-in. water differential.

Alarms are sounded or units are shut down by limiting and protecting features under abnormal conditions which could not be anticipated by the operator.

Warning of an abnormal situation is given throughout the station by a common alarm bell and identifying red lights. Alarms and lights are simultaneously energized. There are three flashing red lights: (1) in the window between pump and control rooms; (2) on the wall of the engine room at the control-room end of the operating aisle; (3) at a prominent position in the utility room—these lights continue until terminated by an operator; (4) on the control board there is a red light for each primary protective device.

Motor-Operated Valves

For valve control there are push buttons and indicating lights. Near each valve there is explosionproof "open-close-stop" push-button control within the station for remote operation and "locally" at the valve for emergency and maintenance purposes. There is an individual circuit breaker for isolating power supply of each valve motor.

Each main-line pump has motor-operated suction and discharge valves. Discharge valves can be opened only after the suction valve is fully opened. Suction valve can be closed only after discharge valve has started to close.

Pump Protection

To provide for venting the top of the pump case preparatory to starting, a vent bleedoff connection is provided in the pump case with a diaphragm valve (air-to-close) served by a three-way solenoid air valve.

For cooling the pump while operating against closed discharge, when the engine is warming up, a 2-in. bypass connection at the upstream side of the pump discharge valve relieves to a station suction tank. This is equipped with a diaphragm valve (air-to-close) actuated through the same three-way solenoid valve which controls the pump vent valve.

Main-line pumps are shut down by automatic switches when suction pressure drops below 10 psi. and when case pressures in the two downstream units exceeds 1,100 psi. Alarm sounds and red signal lights are shown.

Pressure indicators at the control board show: (1) incoming line pressure; (2) pressure on downstream side of strainers; (3) case pressure of each booster pump; (4) suction pressure of main-line pumps; (5) case pressure of each main-line pump; (6) outbound line pressure.

Main-line pump engines are normally started and stopped "locally" at the engine. In an emergency, the unit may be stopped at the control board by push button.

Engine Instruments

Engine operation for pump and generator units is facilitated by the following instruments: (1) speed indicator calibrated for 0-400 r.p.m. (at engine and control board); (2) speed-control switch for adjustment for 280-375-r.p.m. range at engine; (3) temperature protection switches in jacket water of each engine with indicating lights at engine and control boards.

Sump level is held below predetermined maximum by automatic starting of two duplicate sump pumps. When sump level rises excessively, an alarm sounds and a signal light shows. When instrument air pressure drops below 50 psi., alarms and signal lights function. Air differential failure (engine to pump room) is shown by signal.

Emergency lighting for the control room is provided by low-level illumination in case of lighting-circuit interruption. This is accomplished by an a.c. undervoltage relay, which when deenergized, connects with a battery supply. To protect the storage battery voltage from running down during emergency lighting, a d.c. undervoltage alarm is given and a light signal is shown.

Remote Tank Gaging

Each tank is equipped with remote level gage having an electric indicator at the station's control board. For maintaining gage service during interruption of 120-volt a.c. supply, each gage includes provision for automatic transfer to 18-volt d.c. supplied from a battery.

At each tank a low-level switch actuates audible and visible alarms on the control board when tank level drops to 1 ft. above minimum working level. A similar high-level switch functions when the tank level rises to 2 ft. below maximum working level.

Suction Pumps

Each suction pump is operated normally by push buttons at the control board. There are also local push buttons at the pumps. Suction pumps also have motor-operated valves and pressure gages electrically connected to the control board. Furthermore, excessive suction pump case pressure is indicated at the control board.

A low-suction pressure switch is set between each suction pump and the suction valve which shuts down the unit so that restarting cannot be done until there is adequate suction pressure. Each suction pump has a high case-temperature switch which shuts down when case temperature is above 185° F. and prevents restarting.

Dust Protection

Dust storms are likely to occur anywhere along the line. To minimize the harmful effect of dust, the main air supply to each pump station building will be filtered and delivered to the engine, utility and control rooms by positive-pressure blowers.

At Qaisumah station, special blowing and air-cleaning equipment operating with a water screen will be provided. At that location ambient temperatures rise to 125° to 130° F. With the effect of heat from roof and engines, the temperature within the main pump station may rise to 150° F. without effective ventilation. Caulking and weatherproofing of the station building will precede installation of blowing equipment.

All lubricating oil is cleaned by two types of filters. One of these filters cleans a small quantity circulated continually through it from the sump. Before oil goes to the engines, it passes through another filter as an insurance that it contains no harmful material.

Blue Ridge Field Stages Comeback

(Continued from page 55)

for this field are being set for both butane and diesel-engine-powered rigs.

Butane rigs.—An average penetration rate of 58 ft. per hour was made during the summer of 1950 by Gilger Drilling Co., Houston, on a 5,500-ft. rig contracted for H. L. Hawkins of Houston. Using 3½-in. drill pipe, crews drilled 3,771 ft. of 8¾-in. hole in 65 hours of actual drilling time at 1 Davisson on the northeast flank, after cracking the cement plug below the surface pipe set at 329 ft. During an 8-hour tour, as much as 900 ft. of hole was cut, or an average of 112 ft. per hour. Only three rock bits were used to drill to a total depth of 4,100 ft.

These rates represented the best in four holes cut by this contractor for the same operator. Other wells compared were 2 Davisson, 1 First National Bank (86-acre tract), and 1 Scott (10-acre tract), the latter two being drilled on the northwest flank.

Draw works was direct driven by a single 185-hp. butane engine. A 6 by 12-in. mud pump was employed. A 96-ft. derrick was used to pull doubles.

Casing and cementing record.—This contractor set the surface string of 10¾-in. pipe at depths ranging from 300 to 400 ft. Open hole was carried down to the middle Oligocene, Frio, or Vicksburg objectives varying from 4,100 to 4,600 ft. where the long string of 5½-in. o.d. 15.5-lb. pipe is set and cemented with 500 sacks.

Diesel-powered rig.—One of the fastest penetration rates for wells drilled in Blue Ridge field to date was made recently at Shudde Brothers 2 Bassett Blakely situated on the northeast flank of the field. Livingston Drilling & Well Service Co. Rig 1 cut 2,750 ft. of hole in 52½ hours of actual drilling time, or an average of 52 ft. per hour. Only two rock bits were required.

Summary of drilling performance is as follows:

Operation—	Date
Spudded	Sept. 9
Set surface pipe to 300 ft.	Operation completed Sept. 9, 4 p.m.
Reached 3,054 ft., TD	Sept. 12, 2 a.m.
Total elapsed time	58 hours
Total time on bottom	52½ hours*
Average penetration rate	2,750/52½ or 52 ft. per hour

*Allows for ½ hour per 8-hour tour for greasing parts and checking of connections.

Contractor owners of the rig state that one crew can stack it in 8 hours and that a short haul from Blue Ridge to Big Creek field, 5 miles to the southwest, can be made and drilling started without breaking tour.

Specifications.—The rig is designed for drilling to 6,000 ft. and for workover service to 11,000 ft. The portable mast is 93 ft. high and, as mounted on the substructure, will withstand a test load of 350,000 psi. The draw works is a double-drum unit with a 16-in. jackshaft, modified from a U-15 Unit rig. It is direct driven with a twin six-cylinder 130-hp. diesel engine. The other diesel drives the mud pump.

Other features of the rig include:

Rotary: 17-in.

Drill pipe: 6,100 ft. of 4-in. o.d. 14-lb. internal upset with flash-weld tool joints.

Drill collars: one 6-in. by 28 ft.; one 6½-in. by 28 ft., and one 8-in. by 28 ft.

Steel pipe racks: 30-ft. sections.

Rotary hose: 50 ft. by 3 in. equipped with 4-in. connections.

Drilling line: 1⅛-in. diameter.

Sand line: ⅝-in. diameter.

Light plants: one 3-kw. and one ½-kw. units.

Producing Methods

As of September 1, 1950, there were 62 wells producing in the Blue Ridge field as follows:

Flowing	10
Rod pumping	49
Gas lift	3

Electrification. — Electric service is readily available in all sections of the field. All beam-pumping wells are being operated electrically. Field distribution is made at 2,300 volts by Houston Lighting & Power Co. which transmits power to the area at 12,000 volts and steps down to 2,300 volts through two substations.

The oil operators take service at 2,300 volts. Each has his own transformer substation to reduce voltage to 480 or 240 volts for distribution on the various leases. Each well is equipped with motor-starting equipment. Motor rating may be 7½, 10, or 15-hp. Capacitors for power factor correction have been installed in nearly all cases. Not only do capacitors improve electric conditions on the leases but their use results in substantial savings on power costs.

Economics.—The over-all average cost of electric service is 1.56 cents per kilowatt-hour. The average cost of electricity per barrel of oil lifted (based on a total daily average production of 750 bbl. per day for all electrified leases) is $0.04.

Gas-Lift Operations

One operator on the west flank of the Blue Ridge dome is producing oil from the upthrown, domeward side of a peripheral fault. In the past, the chief source of operating trouble in this area arose from the character of the unconsolidated sand itself. To eliminate sand invasion, various production methods were attempted, as follows: (1) squeeze-cementing, (2) bailing, (3) use of liners, (4) flowing wells at both low and high producing rates, and (5) setting pumping barrel at various levels. The average depth of the casing perforations was 3,900 ft. from the surface.

None of these methods proved satisfactory in the experience of this operator. Trouble was particularly acute when the wells were placed on the beam. It has been found necessary always to move in a pulling unit when the wells sanded up. In one instance, 2 months were consumed in removing the tubing and rods. One well sanded up on an average of three times a week during a period of 3 months. In addition to the time required to obtain a service crew (which required from 8 to 12 hours) the same amount of time was needed to jar the sand loose and to break it around using a surface pump. At the end of the first 2 years of this case history, the total oil produced from that flank of the dome was less than 45,000 bbl. from four wells.

After these unsuccessful applications, the operator resorted to the use of a closed, rotative gas-lift system. During January 1946, two wells were placed on gas lift and later flow valves were installed in two additional wells.

This operation employed a 75-hp. compressor with a capacity of 500 M.c.f. per day with a maximum discharge pressure of 600 psi. Provisions were made for a separate test separator so that production from any one well could be obtained accurately and with ease.

During the first year, a per well average of from 300 to 500 bbl. of gross liquid was lifted each day by this type of operation. One well, produced on gas lift, yielded enough sand completely to fill the separator and most of the boot in the gun barrel. These reservoirs lie in the Frio formation which is comprised of a series of extremely fine-grained unconsolidated sands. Only one shutdown was experienced due to sanding up after gas-lift operations were initiated.

Makeup gas. — Solution gas produced from adjacent wells furnished the makeup supply. Although a commercial gas line crossed this area, no additional makeup gas was required except when it was necessary to start up operations after the compressor had been shut down for a lengthy period of time. The volume of formation gas was more than sufficient to supply the prime-mover needs as well as lease fuel requirements. As other wells ceased to flow, these were placed on gas lift. At one time, as many as six wells were produced by gas lift in this sector without the necessity of requiring additional sources of makeup gas.

Proration

The Texas Railroad Commission allocates production at Blue Ridge on a per well basis. Maximum per well allowable is 60 bbl. per day. The cur-

rent total field allowable as of November 1, 1950, was 1,320 bbl. per day for 55 oil wells on 29 leases.

Geology: Structure

Blue Ridge is a salt dome of the piercement type. The salt reaches to within 230 ft. of the surface. The dome exhibits a general outline which shows an elongation into a northwest-southeast major axis. This axis measures about 1 mile in diameter on the 1,000-ft. cap-rock contour.

Cap rock.—Development of the cap rock appears to be limited to the area immediately overlying the salt core. The cap rock is comprised principally of gypsum. Wells drilled into the top of the cap lose circulation. Some of the crevices observed in a shaft drilled for salt were wide enough for two men to stand in.

Salt.—The structure of the dome as contoured on top of the salt is shown on the accompanying map. Unlike Barbers Hill or Hockley, Blue Ridge exhibits no overhang. The shallowest-known penetration is 230 ft. Over the highest original contours of the salt mass, solution has taken place resulting in subsidence and slumping of the surface. This has caused a topographic depression between two mounds which rise 20 ft. above the coastal plain. Salt is being mined at this time from the crest of the dome.

Stratigraphy

Pleistocene.—From the surface down to about 500 ft., the subsurface is comprised of the Lissie and Beaumont formations. Lithology is alternations of gravel, sand, and varicolored mottled clays.

Miocene and Pliocene.—Lying beneath the mantle of Lissie and Beaumont formations are the Oakville, Lagarto, and Goliad formations. The latter group are comprised of blue, red, and green clastic sediments.

Miocene: Catahoula formation.—A fairly constant interval of 50 ft. of Catahoula is found at the base of the Miocene section around the flanks of the dome. The Catahoula is a yellowish-green bentonitic clay. A sharp break can be recognized on electric logs between the base of the Miocene and the top of the Oligocene shales.

Oligocene: Anahuac formation.—Normally 600 ft. of the Anahuac formation is logged in this part of the Gulf Coast province. Thickness of members of this formation are shown by the following data:

Flank	Operator, well—	Discorbis zone	Heterostegina zone
SE	Mills Bennett 12 Luscher	120	340
SE	Mills Bennett 13 Luscher	120	399

Oligocene: Frio formation.—At Blue Ridge the Frio formation is comprised of olive-greenish, gray, calcareous shale containing fine angular, cloudy, pale cherty sand and some white, fine volcanic ash. The formation attains a thickness of 630 ft. on the west flank of the dome in 3 Robinson-Bashara, sidetracked hole, where there is excellent development of four sand members as follows:

Lentil	Interval from top of Frio	Gross sand thickness
A	160	28
B	300	26
C	372	38
D	570	52

A major unconformity exists between the Anahuac formation and the Frio. Here the Frio is unevenly deposited on the flanks of the dome. Locally, it is interrupted by both radial and peripheral faulting.

Thin Frio section.—A pronounced shortening of the lower two-thirds of the normal Frio section is known from wells drilled on the southeast flank. The following correlation of wells drilled into the Vicksburg section compared with Pierce Junction, Mykawa, and North Thompsons fields shows a decided thinning of the Frio at Blue Ridge:

	Blue Ridge, SE flank Mills Bennett 4 Luscher	Pierce Junction East flank, 11 Cain	Mykawa SW flank, McDannald 1 Brown	North Thompsons, Naylor 4 Musselman
T/Marg.-Frio	4,380	3,968	5,330	5,442
B/Frio	5,000	5,868	7,200	7,412
Total section	620	1,900	1,870	1,970

This condition was also observed in Mills Bennett 11 Luscher which logged only 1,577 ft. of Frio section or approximately 350 ft. short of the average normal section of 1,930 ft. No. 11 Luscher is located approximately 2,400 ft. southeast of No. 4 well.

Vicksburg formation.—At Blue Ridge, the Vicksburg formation of lower Oligocene age is found only on the flanks of the dome. The formation feathers out updip. In this part of the Gulf Coast province, the Vicksburg attains a normal thickness of from 1,100 to 1,200 ft. An apparent thickness of 1,173 ft. of Vicksburg principally shale, was logged from 7,459 ft. (first **Textularia warreni**) to 8,632 ft. (first **Marginulina cocoaensis**) in an outpost well situated ½ mile southeast of the salt mass. This was McCarthy Oil & Gas Corp. 1 H. Rabb, located on a 160-acre lease in the Thomas W. Thompson Survey.

At Blue Ridge, the top of the Vicksburg zone is fossiliferous, sandy shale. It contains black, lignitic shale, few brown glauconite, abundant, thin, smooth pelecypods, and very fine brown-stained sand. Micro-fauna are rare **Textularia warreni, T. mississippensis, T. tumudulum, Lenticulina,** and **Haplophragmoides** (large).

Problems Solved at Globe Refining

(Continued from page 56)

than with shell-and-tube exchanger equipment. Also, it cannot be used when the refinery process water system includes cooling towers.

The direct-contact gas-oil liquid-vapor system at the Globe refinery has functioned to the satisfaction of operating personnel since its installation. The two gas-oil circular sprays are made of 4-in. Schedule 40 alloy pipe and installed with orifice whirljet-type sprays facing down in the tower. The accumulator drip ring in the lower part of the tower functions to recover additional gas oil. The gas-oil drawoff from the drip ring operates on liquid-level control.

Pivoted Dashpot

Another change in original installation at the Globe refinery was incorporation of a pivoted dashpot to facilitate positive closing of the swing-check valve mounted vertically in the 24-in. air line to the 6,000-bbl. per day catalytic cracking unit. The free-flow reverse-current swing valve was equipped with a side dashpot in the original installation, but operation was not satisfactory. The original linkage caused binding of the shaft and sticking of the check valve. It was feared that if the check valve failed to close properly upon blower failure, catalyst would blow back through the blower into the air intake. To eliminate sticking the original linkage was replaced with a Z-arm which permits the dashpot to move as illustrated in Fig. 2.

Distributing Spider

Fig. 3 shows arrangement of piping which makes up an inlet distributing spider installed in an 80,000-bbl. crude-oil storage tank to keep down accumulation of bottom sediment. Since installation of the distributing spider in June 1945 no cleaning of the tank has been required. Crude-oil is pumped into the tank every 10 days on the average.

The distributing spider consists of an 8-in. inlet pipe into which crude oil is delivered from pipe line and from barge and tank cars. Branch lines of 2-in. pipe come off at right angles from another 8-in. pipe flanged below the inlet line, as shown. The 2-in. lines rest on supports on the tank bottom and have both ends open. When crude is pumped through the distributing spider and flows out through the 2-in. lines, bottom sediment is stirred up on the tank bottom and sediment accumulation is effectively reduced. Similar distributing spiders are currently being installed in fuel-oil and gasoline-blending tanks at the Globe refinery.

NEW CAT CRACKER AND ALKYLATION PLANT.—Aerial photo of California Refining Co.'s Barber Refinery at Perth Amboy, N. J., showing construction work on catalytic cracking plant. In left background appears part of the old refinery equipment while behind cat cracker is the new alkylation plant and butane spheres. Facilities are being installed in connection with the alkylation plant, to permit production of alkylates of aviation grade.

IMPROVED ALKYLATION PROCESS

New design features incorporated in two new plants

by George Weber
Refining Editor

THE strong revival of alkylation operations in this country is causing refiners to take a long second look at the process. By expanding runs in operating units and reactivating standby facilities during the past few months, 27 refining companies have been able to meet the current emergency requirements for a stepped-up military aviation-gasoline program.

Projection of the military avgas program indicates augmented runs in existing alkylation units and addition of new plants. Refiners operating the 43 alkylation units now running, and those considering expansion are studying the process in a new light. The higher requirements for alkylates, both in quantity and quality, necessitate a review of the best optimum conditions for operating existing facilities. At the same time refiners are investigating possible improvements which will increase process efficiency.

New Kellogg Improvements

Of timely interest is the recent development by M. W. Kellogg Co., of a number of significant improvements in the sulfuric acid alkylation process[1]. Several revisions of the design employed in World War II

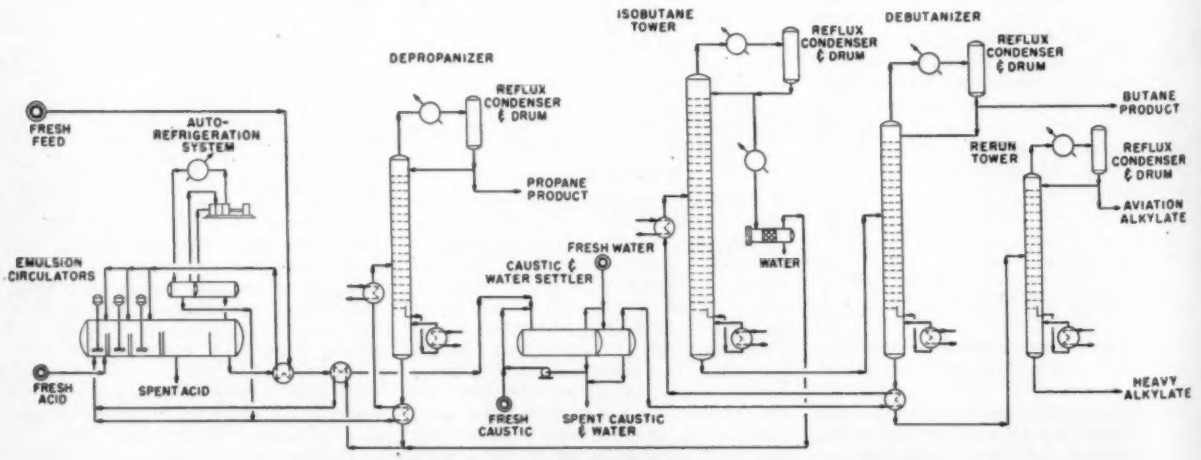

Fig. 1—Flow arrangement of the improved sulfuric acid alkylation process.

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plants promise further advances in yield and quality of product, say Kellogg engineers, which will permit increased production of aviation and motor-grade alkylates from a wider range of hydrocarbon feed stocks.

The innovations in the new Kellogg process comprise a completely redesigned reactor section. As outlined by company engineers, they provide four principal advantages: (1) maintaining a high isobutane-olefin ratio in the reaction zones, (2) permitting a higher over-all acid concentration during reaction, (3) improving contact of catalyst and feed stock by more efficient mechanical mixing, and (4) incorporating autorefrigeration to reduce equipment and operational costs.

The flow chart of the new Kellogg process (Fig. 1) illustrates the principal points of improvement. A redesigned reactor vessel shown at the left operates with a liquid level and provides three reaction zones and a hydrocarbon acid settling section. Fresh acid is admitted to the first reaction zone. It proceeds by cascade flow to the second and third reaction sections and is withdrawn as spent catalyst from the settling chamber.

The employment of three reaction zones permits the maintenance of a high isobutane-olefin ratio, desirable for most efficient reaction. This ratio may be held to better than 9 : 1 although the ratio in feed stocks is only of the order of 1.2 : 1.

Assuming butylene alkylation at a total hydrocarbon feed rate of 600 bbl. per day, isobutane will comprise 360 bbl. and butylene, 300 bbl. daily. The combined feed is split into three equal portions and charged directly to the three reaction zones.

The high ratio of isobutane to olefin is accomplished by recycling isobutane from the isobutane tower in the fractionation section of the alkylation unit. At the assumed feed rates cited above, recycle isobutane is required at a rate of 800 bbl. per day. While the over-all introduction of fresh feed and recycled hydrocarbons to the three reactor zones is slightly less than 4 : 1 (1,160 bbl. of isobutane to 300 bbl. of olefin), the employment of split feed to the individual reaction zones affords a ratio of better than 9 : 1.

The total isobutane recycle stream is admitted to the first reaction zone. Intimate contact of fresh acid with total isobutane and olefin feeds in the ratio of 920 : 100 promotes the rapid reaction of roughly 110 bbl. of isobutane with the 100 bbl. of olefin.

Acid, isobutane, and alkylate cascade to the second reaction zone where isobutane at the rate of about 810 bbl. per day is contacted with the second feed-stock increment, at a total isobutane/butylene ratio of 930 : 100. Following the repeated conversion of a portion of the isobutane stream with the olefin fraction, the total liquids cascade to the third zone where the reaction is repeated at a ratio exceeding 9 : 1.

By contacting fresh sulfuric acid with the split hydrocarbon feed in three successive zones instead of one as formerly, it is also possible to mtaintain a higher over-all concentration of acid throughout the reaction. As an example cited by Kellogg, if 98 per cent fresh acid is reduced to a concentration of 88 per cent before withdrawal, the average acid concentration in all three reaction zones will be 91.5 per cent. This factor in effect reduces the acid consumption per barrel of alkylate produced, thereby improving the economic attraction of the sulfuric acid process.

The substitution of mechanical agitators, termed emulsion circulators, for jet turbulence in the reaction zone affords a marked reduction in mixing costs, say Kellogg engineers. High-quality alkylates can be produced by the new process for a mixing cost of 0.028 kw.-hr. per gallon of product as compared with 0.12 kw.-hr. per gallon in reactors of previous design.

Still another reduction in operating cost results from the use of autorefrigeration as the means of removing heat from the exothermic reaction. Maintaining a liquid level in the reactor vessel permits continuous evaporative cooling of the reacting liquids. Light hydrocarbon vapors withdrawn from the top of the vessel, are compressed and cooled and returned as condensed liquids to the first reaction zone with the isobutane recycle stream. As compared with outside emulsion-refrigeration units, this autorefrigeration system can be installed at much lower cost.

The new improved sulfuric acid alkylation process has been incorporated in two new units—one recently completed and one now nearing completion. A small 800-bbl. per day plant was placed on stream last fall by Mid-Continent Petroleum Corp. at West Tulsa, Okla. A second unit capable of charging 5,000 bbl. per day of hydrocarbon feed is being built by California Refining Co. at Perth Amboy, N. J.

Contracts were let for both of these new installations before the Korean situation brought about the current high demand for aviation-grade alkylate. Although planned specifically for the production of alkylate for blending to motor fuel, these new units may be operated to contribute as well to the military aviation-gasoline program. At such a time that the economy returns to a normal peacetime basis, these units will continue in operation to enable refiners to compete in race for higher octane.

Reference

1. The newly improved sulfuric acid process and a general discussion of alkylation flexibility also are discussed in the latest issue of the Kelloggram, to be released this week.

particularly when setting casing or liners in a tight hole, by running a Baker Rotary Wall Scraper. It provides a safe, positive, low-cost method of enlarging the diameter of an open hole for cleaning up oil sands and increasing the productive area; for gravel packing; for directional drilling and sidetracking. Seven basic body sizes provide for hole enlargement from 4¾" minimum to 36" maximum by progressively changing to larger blades.

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1950 DIESEL-FUEL SURVEY

Report on 266 samples manufactured by 56 companies

by O. C. Blade*

THE use of diesel fuel oil as a source of power has increased very rapidly in recent years, largely because many of the railroads are replacing steam locomotives with diesel units. Other contributing factors include the increased use of diesel engines in buses, trucks, tractors, water craft, and stationary power plants. The increasing importance of diesel fuel has resulted in the need for more information on the types and quality of fuels currently marketed.

In recognition of this need the American Petroleum Institute, in cooperation with the U. S. Bureau of Mines, has conducted a survey of diesel fuels produced in refineries in this country during 1950. Under a cooperative agreement, samples of diesel fuel oil, representative of shipments from refineries, were analyzed by the manufacturers, and the results were transmitted to the Bureau of Mines for compilation and publication.

The report presents data on 266 samples of diesel fuel manufactured by 56 companies. The data are summarized in the accompanying table.

*Associate petroleum chemist, U. S. Bureau of Mines, Bartlesville, Okla.

Average, minimum, and maximum values from the analyses are shown.

Part 1 of the table shows values according to four classes of service as follows: (1) diesel fuel oils for use in city bus and similar operation; (2) diesel fuels for use in trucks, tractors, and similar service; (3) fuel for railroad diesel engines; and (4) heavy-distillate and residual fuels for large stationary and marine diesel engines.

Part 2 of the table shows values, from the same data, separated into four groups according to A.S.T.M. grades as follows: Grade 1-D, fuels having 625° F. maximum distillation end point; Grade 2-D†, fuels having 675° F. maximum distillation temperature at 90 per cent recovered, and pour points of 0° F. or lower; Grade 2-D‡, fuels having the same 90 per cent limitation, and pour points above 0° F.; and Grade 4-D, fuels not conforming to the A.S.T.M. limitations of Grade 1-D or 2-D fuels.

The original analyses are tabulated in the report under the same headings, and additional information is included to show the grade of burner fuel oil under which designation some of the material is also marketed, and the geographic areas in which the fuels are distributed.

A copy of R.I. 4746, "National Annual Diesel-Fuel Survey, 1950," may be obtained without charge by writing to the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh.

BOOKS

PAPERS ON RADIOGRAPHY. Published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 95 pp. $1.75.

In an attempt to correlate late develments of radiography, the papers and discussions of a session on the subject at the fifty-second annual meeting of the A.S.T.M. have been published. The compilation contains the following papers: Recent Progress in Flash Radiography—J. C. Clark; 10 Mev X-ray Technique—D. T. O'Connor, E. L. Criscuolo, A. L. Pace; Radiography and Autoradiography by Photoelectrons—D. T. O'Connor, W. R. Maddy; Mobilizing the Van de Graaf Generator for Precision Radiography—E. A. Burrill; A Universal Exposure Calculator for Radium Radiography and Its Application to Current Radiographic Films and Techniques—N. A. Kahn, E. A. Imbembo, J. Bland; A Discussion of Radiographic Sensitivity—C. H. Hastings; A Revised Procedure for Establishing Radiographic Standards—L. W. Ball; and An Investigation of Radiography in the Range From 0.5 to 2.5 Million Volts—W. W. Buechner, R. J. Van de Graaf, H. Feshbach, E. A. Burrill, A. Sperduto, L. R. McIntosh.

SUMMARY OF VALUES, DIESEL-FUEL SURVEY, 1950

Diesel fuel oil (class)	Type of service	Gravity D287* (°A.P.I.)	Visc. at 100° F. Flash point D93* (°F.)	Visc. at 100° F. Kinematic D445* (cs.)	Visc. at 100° F. Say-bolt D88 (sec.)	Sulfur content, D129* (%)	Aniline point, D611* (°F.)	Carbon residue, D524* on 10% residue (%)	Corrosion, D130* 3 hrs. at 122° and 212° F.	Ash, D482* (%)	Cetane No. D613*	Distillation D86* or D158* (°F.) Per cent recovered I.b.p.	10	50	90	End point
1	City bus, etc.															
Average		39.6	161	2.40	<34.2	0.205	153	0.068	Neg.	0.001	51.0	367	415	469	540	587
Minimum		30.8	120	1.45	30.2	0.01	118	0.00	....	0.000	35.0	318	345	388	454	477
Maximum		47.2	265	6.03	45.6	0.83	176	0.44	....	<0.010	64.5	513	543	578	642	710
2	Trucks, tractors, etc.															
Average		37.2	173	2.96	35.9	0.319	156	0.069	Neg.	0.001	51.5	382	444	508	565	638
Minimum		30.7	131	1.60	<32.6	0.011	118	0.00	....	0.000	35.0	329	373	424	490	526
Maximum		45.5	265	6.03	45.6	2.05	178	0.44	....	0.020	68.1	513	598	657	693	740
3	Railroad															
Average		37.1	171	2.95	35.9	0.287	155	0.083	Neg.	0.001	51.8	382	445	507	586	639
Minimum		30.7	132	2.00	32.6	0.023	130	0.00	....	0.000	35.0	329	386	444	508	570
Maximum		45.0	265	6.03	45.6	0.983	178	0.30	....	0.020	68.1	513	598	657	693	740
4	Stationary, etc.	(No average, minimum, or maximum values determined. See analyses in original report)														
A.S.T.M. grade	Limiting specification															
1-D	Max. end point, 625° F.															
Average		40.0	159	2.27	33.8	0.200	153	0.053	Neg.	<0.001	52.0	369	417	468	532	575
Minimum		30.8	120	1.45	30.2	0.01	122	0.00	....	0.000	35.0	318	345	388	454	477
Maximum		47.2	224	3.78	38.4	0.983	176	0.27	....	<0.010	68.1	470	504	547	591	627
2-D†	Max. 90% point, 675° F.															
Average		36.5	171	2.92	35.8	0.326	153	0.081	Neg.	0.002	50.1	380	441	508	593	652
Minimum		30.6	136	2.05	32.8	0.014	113	0.00	...	0.000	36.0	330	396	452	553	628
Maximum		44.7	250	4.75	41.5	1.95	178	0.44	...	0.020	61.0	474	507	578	654	710
2-D‡	Max. 90% point, 675° F.															
Average		34.8	185	3.89	38.8	0.457	157	0.091	Neg.	0.001	50.3	396	471	541	621	677
Minimum		27.5	140	2.69	35.0	0.054	137	0.00	....	0.000	40.5	329	411	517	583	628
Maximum		42.1	265	6.03	45.6	2.05	178	0.23	....	0.010	64.2	513	569	607	671	726
4-D																
Average		25.3	199	13.70	76.8	0.79	146	§1.07	Neg.	0.022	39.5	417	510	622	695	759
Minimum		12.9	166	2.11	33.0	0.16	125	§0.01	....	0.000	23.0	340	428	468	617	693
Maximum		38.1	265	68.5	316.8	2.33	192	§5.53	....	0.18	59.1	483	598	695	791	913

*A.S.T.M. Designation. †Pour points 0° F. or below. ‡Pour points above 0° F. §On 100 per cent sample.

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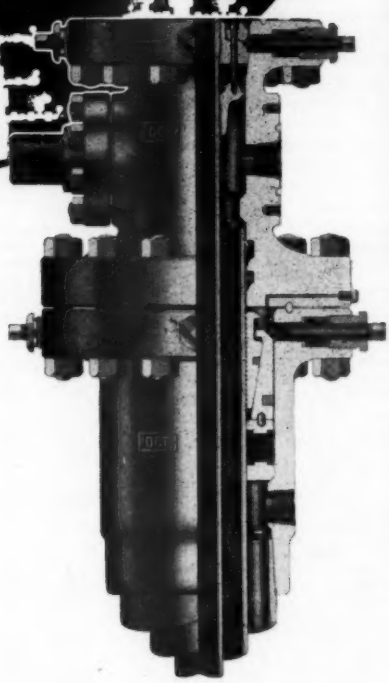

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Vanadium in Crude Oils—4, Effect of V_2O_5 on Refractories

Note: This is a continuation of discussions which have appeared in three issues in answer to the questions stated in the issue of November 30. The effect of high vanadium ash on metals will be discussed in an early issue.

When fuel ash and a refractory are in contact at a moderately high furnace temperature, a fluxing action may occur producing a slag which is more or less fluid. The composition of the slag, the temperature of its formation, etc., will, of course, vary with different refractories and with ashes of different composition. Strong fluxing agents in the ash are alkali salts (Na_2O, K_2O, Li_2O), lime, and ferrous oxide. Many less well-known metal oxides such as those of molybdenum and vanadium are also fluxing agents. At least three actions of the slag may be recognized: (1) abrasion, (2) penetration, and (3) chemical reaction.

Abrasion probably has little effect although grooving or channeling effects are sometimes noted. Abrasion by ash particles impinging on the refractory surface are probably not significant although such an action would help to stick the particles to the surface or perhaps drive them into crevices. The penetration depends somewhat on the density or hardness of the refractory. In addition, each slag differs in viscosity and surface tension, causing different rates of penetration. Thus, a viscous slag may glaze the surface and impede further penetration. Likewise, such a slag would not effectively penetrate the capillary pores of the refractory. A slag of low surface tension or good spreading quality would tend to cover surrounding areas, thus exposing more of the surface to chemical reaction or slagging effects[1]. The unusually great reduction of the surface tension of certain slags of molybdenum trioxide is known[2], and many other oxides including vanadium pentoxide have some effect on surface tension. It is scarcely necessary to mention that chemical reactions are vigorous between some materials and slow or nonexistent between others.

Only one noteworthy study of the effect of vanadium pentoxide on refractories is available to this department. Quigley Co., New York, manufacturers of refractory and insulating products, has applied pure V_2O_5 to the surface of refractories and has noted the effect of prolonged heating. The experiments were aimed primarily at finding a refractory material that could be used to protect high-chromium-nickel steel furnace castings from the effect of vanadium ash. Five materials were tested:

1. A chrome-base surfacing material. (Q-Panelchrome.)
2. Insulating concrete. (Plastic Insulcrete.)
3. Plastic insulation. (Insulag.)
4. An alumina-silica surfacing material. (Panelclad.)
5. Aluminum oxide.

A series of six heats of 5 hours each at 1,300° F. in a muffle furnace (V_2O_5 melts at 1,274° F.) were conducted. A ⅛-in. layer of pure powdered vanadium pentoxide was spread over slabs of each of the materials. The slabs were 1 in. thick.

After the first heating period of 5 hours, all of the materials had been penetrated to the extent of about ⅛ in. After the full six heats, it was found that the order of usefulness was about as indicated in the tabulation above. The chrome-base material (1) was penetrated to a depth of only ⅛ in. indicating that all of the V_2O_5 may have reacted during the first cycle of heating. The insulating concrete (2) was penetrated to a depth of ⅝ in. but no cracks appeared. Although the plastic insulation material (3) was penetrated to a depth of only ¼ in., large cracks appeared throughout the body of the material. The other two materials, (4 and 5) were attacked so vigorously that penetration through the entire 1-in. thickness of the material occurred, and also cracking. It is understood that a chrome-base (Q-Chromastic) surfacing material of Quigley Co. can be easily applied to fire brick, etc., and it has been applied to boiler furnace walls.

References

1. Faulkner, L. R., "The Slagging Action of Fuel Oil Ash," Bull. Am. Cera. Soc., Vol. 13, p. 45 (1934).
2. Amberg, C. R., "Effect of Molybdenum and Other Oxides . . .," J. Am. Ceram. Soc., Vol. 29, p. 87 (1946).

Effect of Carbon Black on Rubber

How does carbon black react with rubber?—F.R.C.

The general concept has been that carbon black unites with rubber in merely a physical way. However, Stearns and Johnson, of Firestone Tire & Rubber Co., have conducted researches which indicate that the submicroscopic particles of carbon black are really very large molecules having active carbon atoms on their surfaces. These active carbon atoms permit the carbon black to react with similar active atoms of the rubber via carbon-sulfur bonds during vulcanization. The new concept was discussed before the American Chemical Society, Detroit, April 21, 1950, in a paper by Stearns and Johnson.

Bottom Temperatures

Can you give me information on how to calculate the bottom temperature of a deethanizer in an absorption plant? All design information regarding the feed, the products, etc., are known. C. V.

Bottom temperatures are dependent on only four major factors:

1. Composition of bottom product.
2. Pressure.
3. Heat losses.
4. Amount of inert stripping agent.

If no stripping agent is employed and if a reboiler is used, the calculation of bottom temperatures is very simple. The reboiler supplies any heat losses and hence only Items 1 and 2 above need be considered. Thus, the computation involves nothing more than to compute the bubble point of the bottom product at the existing pressure. The bubble point is the temperature at which the sum of the partial vapor pressures of the components in the liquid is equal to the total pressure (or equal to 1.0 if equilibrium constants rather than vapor pressures are employed). In terms of equilibrium constants:

$$1.0 = K_1X_1 + K_2X_2 + K_3X_3 \text{ etc.}$$

in which the K's are the equilibrium constants of the several components and the X's are the mol fractions of the components in the liquid product. Temperature is selected until by trial and error, the equation is satisfied.

If a stripping agent is employed, then the partial pressure in the gas phase just above the bottom product is used rather than the actual or total pressure. Thus, if the gas phase is half vapor (produced by the reboiler) and half steam, a value of 0.5 rather than 1.0 would be used in the equation. However, the computation of the partial pressure above the bottom product is not easy or simple because it involves a heat balance to determine the reboiler vaporization, and some computation to determine the amount of inert stripping agent. Such computations are too long for this page.

Finally, if a reboiler is not employed, the computations become even more complicated because the stripping of components out of the liquid reduces the temperature and the inert agent requires sensible heat.

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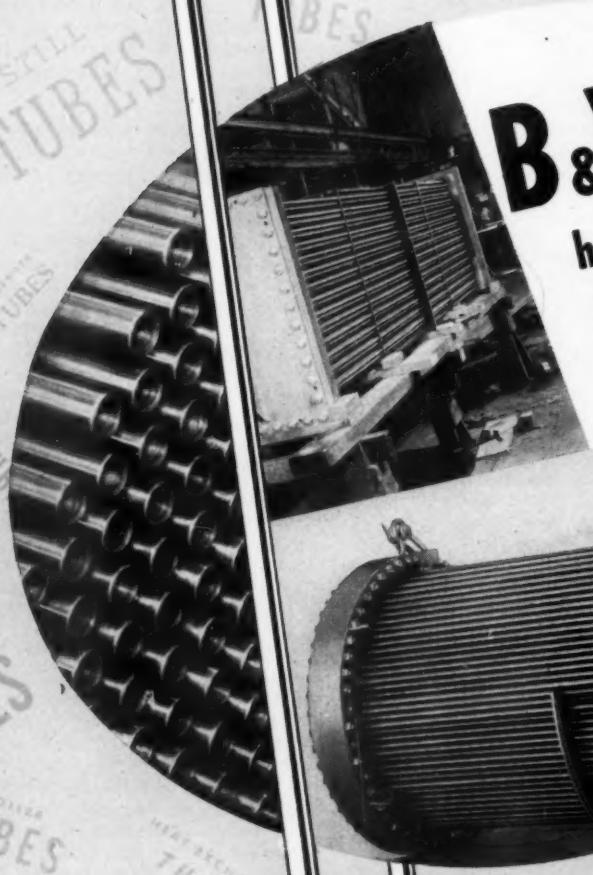

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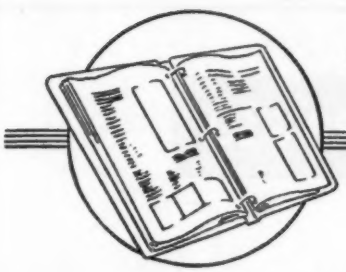

THE REFINER'S *notebook*

Introduction to Greases*

What are greases?
How does grease lubricate?
What factors influence grease characteristics?
What are the trends in grease manufacture?
Consumer demands in greases. What do they mean?
These and other questions are answered in a special series on an important group of petroleum derivatives—the modern lubricating greases — prepared by Shell Oil Co. and beginning in this issue of The Refiner's Notebook.

LUBRICATING greases, which were the first commercial lubricants, have been poorly "publicized." The first of "modern" lubricating greases—a mixture of lime-base soap and crude petroleum oil—was manufactured in 1845. This was 14 years before the first oil well was drilled (on August 27, 1859) and the petroleum industry officially started.

In the minds of many, however, lubricating greases came to be valued chiefly for their ability to "stay put" in those applications where it is uneconomical to "seal in" a fluid lubricant or where a fluid lubricating system would be impractical. As a result, greases were consigned more and more to those applications where it was believed that mechanical considerations did not allow the use of fluid lubricants and did not seem to merit the cost of adaptation to fluid lubrication.

Recent research into the atomic nature of matter has led to a wealth of new information about the behavior characteristics of the elements in given substances. Especially important to this discussion are the facts that have been learned regarding the behavior characteristics of the substances which go to make up a modern lubricating grease. It is the story of these recent facts, and the even more recent theories, analogies, and hypotheses regarding greases which form the basis of this series.

Greases—past and present.—An attempt to interpret the functions of lubricating greases by a study of their possible applications would require a large volume of written material, for the applications are countless. On the other hand, if an attempt were made to study the applications from a grease-by-grease approach the book would be equally as large. Individual greases, too, are practically beyond count. This is partly due to the past practice of "inventing" a different grease for almost every seemingly "different kind" of application. Each grease-maker was considered an "artist" rather than a technician. Like a chef, he would mix his greases and judge by smell and feel—and even by taste—whether the greases had been made to his liking. Thus there was a time when greases were about as individual as the grease-makers who made them. And there was no assurance that even the same grease made by the same grease-maker would exhibit identical characteristics from batch to batch.

This era is past, however, and greasemaking has become a definable science presided over by skilled technicians. The behavior of greases no longer depends solely upon the artistry of the grease-maker. In fact, many modern greases are manufactured under such rigid controls that the mixtures need not even be seen by the men in charge of the operation. Continuous grease-manufacturing methods with automatic control of each step in the process, resulting in maximum uniformity in the production of certain types of greases, are already in operation.

Grease is a mixture.—Lubricating grease, in its most common form, is a smooth, plastic mass somewhat like soft butter in consistency. Essentially, it is a mixture of a metallic soap and petroleum lubricating oil. The degree of its plasticity—or resistance to deformation by relatively small external forces, as well as its general physical and chemical characteristics, are subject to wide variations. These depend upon the kind of soap used in the mixture, the processes by which these ingredients are combined, and the presence of other substances in the finished product—water, glycerin, and various chemicals that may be added in the course of manufacture.

Some greases sold in "brick" form are so hard they are difficult to cut with a knife; others are so soft as to be fluid at ordinary temperatures. Regardless of these wide variations in consistency, all lubricating greases can be classified in the broad category of "plastic solids." Their plasticity is probably the one physical characteristic of greases that is most familiar to all of us.

When we consider this plasticity of greases, the question naturally arises, "What causes it?" Why does the addition of a relatively small quantity of a metallic soap to a fluid petroleum oil cause the mixture to "jell" into a soft, plastic mass? Obviously, some important things must happen when the soap is added to the oil. The answers to what these changes are—and why they happen—cannot be understood until we dig deeply into the chemical composition of soaps and oils.

*From material prepared by Shell Oil Co. on "Fundamentals of Lubricating Greases."

No. 52 in current series. The Refiner's Notebook has been published continuously since 1944.

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Gas and Water Coning

THE coning of gas or water into a producing well is generally undesirable. Either may occur under excessive rates of withdrawal. Both are the result of similar conditions. It will be the present object to give some characteristics of coning.

Coning is primarily the result of movement of reservoir fluids in the direction of least resistance, balanced by a tendency of the fluids to maintain gravity equilibrium. The analysis may be made with respect to either gas or water, but generally the coning of gas is more difficult to control because the well has penetrated through that zone and because it is not possible to remove the point of withdrawals sufficiently from the oil-gas contact.

Let the condition of reservoir fluids exist as shown schematically in Fig. 1, water underlying oil and gas overlying oil. A well penetrating the formation is drilled as shown, for purposes of discussion, so that the production interval is halfway between the fluid contacts. In actual practice a well may be barely drilled into an oil zone in order to eliminate the influx of bottom water for as long as possible. The rock permeability will be assumed to be as great in the vertical as in the horizontal direction.

Production from the well would create pressure gradients uniformly in all directions, the vertical as well as the horizontal, if the fluids were uniform throughout. The steady-state representation of this condition would be the spherical flow system with pressure gradients as shown in Fig. 2. The consequence of this is that the pressure gradient tends to flow water and gas into the well bore as it does oil because the distance these other fluids have to travel is less than that to some drainage radius out in the oil bearing portion of the reservoir.

Counterbalancing these flow gradients is the tendency of the gas to remain above the oil zone because of its lower density and of the water to remain below the oil zone because of its higher density. In an open tank, for example, one would need to have an open pipe fairly close to either the water-oil or gas-oil levels and withdraw at a fairly rapid rate to disturb either of the contacts from the horizontal position. In the reservoir, however, the maintaining of levels requires the flow of oil into the area around the well bore and a rapid balancing of gravity equilibrium.

The rate at which the fluids can come to an equilibrium level in the rock may be so slow, due to the low permeability or to capillary properties, that the gradient toward the well bore overcomes it. Under these circumstances the water is lifted into the well bore and the gas flows downward, creating a cone as illustrated in Fig. 3. Not only are the direction of gradients reversed with gas and oil cones but the rapidity with which the two levels will balance will differ. Also, the rapidity with which any fluid will move is inversely proportional to its viscosity, and, therefore, the gas has a greater tendency to cone than does water. For this reason the amount of coning will depend upon the viscosity of the oil compared to that of water.

It is evident that the degree or rapidity of coning will depend upon the rate at which fluid is withdrawn from the well and upon the permeability in the vertical direction compared to that in the horizontal direction. It will also depend upon the distance from the well bore withdrawal point to the gas-oil or oil-water discontinuity.

The elimination of coning could be aided by shallower penetration of wells where there is a water zone, or by the development of better vertical permeability. Although the horizontal permeability could not be lessened, the ratio of vertical to horizontal flow can be increased by such techniques as acidizing or pressure parting the formation. The application of such techniques needs to be controlled so that the effect occurs above the water zone or below the gas zone, whichever is the desirable case. This permits a more uniform rise of a water table.

Once either gas coning or water coning has occurred, it is possible to shut in the well and permit the contacts to restabilize. Unless conditions for rapid attainment of gravity equilibrium are present restabilization will not be extremely satisfactory. Fortunately, bottom water is found often where favorable conditions for gravity separation do exist. Gas coning is more difficult to eliminate because a gas saturation once formed is difficult to eliminate.

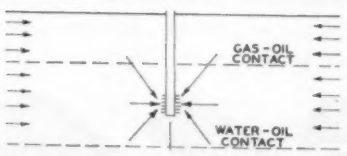

Fig. 1—Direction of flow to give coning. At the well both a vertical and horizontal gradient exist. Back sufficiently from well bore flow is all parallel to horizontal.

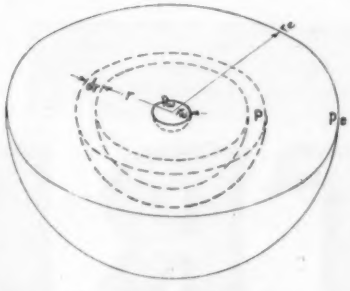

Fig. 2—Spherical system.

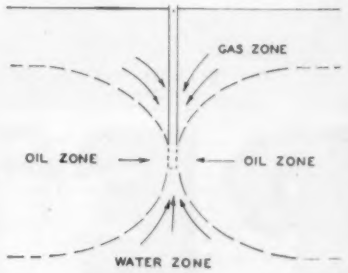

Fig. 3.

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, Penn State College

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PR 50-2

REFINING

Superior Plant Progresses

SUPERIOR, Wis.—The refinery now being constructed here by Lake Superior Refining Co. is expected to go on stream May 1, 1951, according to J. J. Crotser, president. Products will be premium and regular gasolines, kerosine, and Nos. 1, 2, 5, and 6 fuel.

Site of the plant is a 230-acre tract bought from Interprovincial Pipe Line Co., adjoining the latter's Superior crude-storage facilities.

Lake Superior has contracted with Imperial Oil for 4,000 bbl. of crude daily, and has space for this amount in the line. The 4,000-bbl. plant of Carter Oil Co. at Cut Bank, Mont., was purchased by the company on October 1. It has 520,000 bbl. crude and product storage, a 4,000-bbl. skimming unit with a reform unit, and a U.O.P. poly unit. Much of the equipment already has been erected. Refinery Engineering Co., Tulsa, is in charge of the work.

Othe company officers besides President Croster are: T. M. Lumly, Refinery Engineering Co., vice president, and Leslie Olsen, Superior, secretary-treasurer.

Cracking Unit Readied

SALT LAKE CITY.—Installation of a new catalytic cracking plant, principal feature of a $10,000,000 expansion program at the Standard Oil Co. of California refinery here, has been completed. Tests are in progress preparatory to placing the plant on stream.

The cracking facilities will add high-octane gasoline to the refinery's expanding range of products. With completion of the new construction program here, the company will have invested about $35,000,000 in the intermountain area since 1945, mainly in the refinery and two pipe lines—a crude-oil line from Rangely field, Colorado to Salt Lake City, and a products line from the refinery to Pasco, Wash.

To Hike Rubber Production

BATON ROUGE.—Synthetic-Rubber production at the Esso Standard Oil Co. plant here is scheduled to increase from two-thirds to full capacity early next year, according to an Esso spokesman. Production figures for the government-owned butyl plant, operated by Esso, were not revealed because of security regulations.

The announcement of the production hike was made after a Washington announcement that use of natural rubber in automobile tires will be cut. The spokesman said that most of the Esso rubber production has been going into the manufacture of innertubes.

Meanwhile, the Armstrong Tire & Rubber Co. plant at Natchez announces that no reduction in plant output is anticipated as a result of the issuing of a National Production Authority order for a 28 per cent cut from November levels in the use of natural rubber for automobile tires to be produced in January and February.

D. D. Williams, assistant to the general manager of the plant here, said that so long as natural-rubber allotments are replaced with synthetic-rubber allotments, the plant will continue to produce 6,000 tires and 6,000 tubes per day.

The NPA stated that allotments of natural and synthetic rubber will still total 90,000 tons per month, the same as for this month, though the synthetic allotment will be proportionately higher.

To Boost Chemical Output

SAN FRANCISCO.—Plans for further substantial expansion of the Shell Chemical Corp. synthetic-ammonia plant at Shell Point, which will represent an increase in plant output of over 300 per cent during the past 10 years, have been announced by G. R. Monkhouse, general manager.

The additional productive capacity which will result from this expansion was necessitated by increased demands for ammonia by industry on the Pacific Coast. Equipment for the new expansion will be completed and in operation by next spring.

In addition, Shell has announced that the output of its glycerin plant in Houston will be increased by 50 per cent during 1951.

Chief cause of the present shortages, company officials say, has been the reduced production of byproduct glycerin from soap manufacture, due to the greater use of synthetic detergents. The Shell synthetic-glycerin plant has provided an important share of the nation's total production of the product. Glycerin is used in the manufacture of such industrial products as alkyd resins, cellophane, and explosives.

Butadiene Plant Restored

SAN FRANCISCO.—Reactivation work on the butadiene plant at the El Segundo refinery of Standard Oil Co. of California has been completed,

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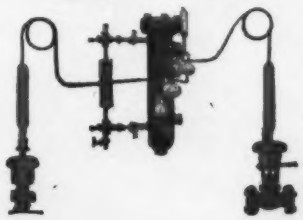

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it has been announced by Petroleum Maintenance Co.

The plant was restored to its World War II operational capacity by authorization of the Reconstruction Finance Corp. Office of Rubber Reserve. It had been idle for several years.

Petroleum Maintenance Co. is also working on the reactivation of a catalytic cracking plant for Wilshire Oil Co. at its Norwalk, Calif., refinery.

New Plant Site Purchased

NEW YORK.—A new waterfront plant site in Newark, N. J., has been purchased by Hydrocarbons Chemical, Inc., New York City, the company has announced.

Work on the premises and on the installation of machinery is already under way on the property in that part of Newark known as "The Island." The site is near state highways and railroads, in addition to fronting on the Passaic River.

Hydrocarbons Chemical, Inc., possesses the only synthetically known method of producing hydrocarbon alcohols such as cresol, phenol, and other alcohol derivatives.

Imperial Awards Contract

EDMONTON, Alta.—Foster Wheeler, Ltd., of Canada has been awarded a contract for the extension of the Edmonton refinery of Imperial Oil, Ltd. The new additions to the refinery consist of a vacuum-distillation unit of 10,000 bbl. per day capacity and a 10,000 bbl. per day catalytic cracking unit with its auxiliary gas recovery plant.

The catalytic cracking unit will be a new design of the fluid type. This will mark the first time this type of unit has been constructed anywhere. The new design, developed by Standard Oil Development Co., is distinguished by simplicity of construction and improved efficiency.

U. K. Octane Increase

An increase in octane rating of the gasoline sold in the United Kingdom is anticipated early in 1952 when the new British refineries are in full production.

The so-called pool motor fuel marketed in Britain has an octane number of 70, in contrast to the high-quality gasoline of 80 octane available before the war. Oil companies in the United Kingdom are now making plans for the time when they will be permitted to sell higher-octane motor fuel, and a return to 80 octane is expected when the branded product is again on sale in about 18 months.

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NATURAL GAS

Carbon-Black Outlook Good

The impending construction of two large carbon-black plants has strengthened recent testimony by producers to the National Production Authority that the carbon-black balance sheet for the immediate future looks good on the basis of present defense and civilian demand.

A site has already been acquired at Bayou Sale, St. Mary Parish, Louisiana, near the Gulf Coast for one of these plants, it has been announced by Godfrey L. Cabot, Inc., Boston.

The second plant, for which construction plans have been announced by United Carbon Co. of Charleston, W. Va., will be located at Shamrock, in the Texas Panhandle, and will cost in excess of $1,000,000.

Included in plans for the Bayou Sale plant to be constructed by a Cabot subsidiary, Cabot Carbon Co., are a thermal carbon-black plant of 30,000,000 lb. annual capacity and an adjoining oil-furnace, carbon-black plant of 50,000,000 lb. annual capacity. Negotiations for a natural-gas supply have been satisfactorily completed. The oil-furnace units will operate on liquid hydrocarbons, residue oils, and tars as raw materials.

Thermal blacks will be produced for the rubber-manufacturing industry. Some part of the total thermal-black production is to be further processed into a high-purity, metallurgical carbon, for use in increasing the production rate of steel. This new development also is used in the manufacture of specialty electrodes.

1949 Gas Figures Released

WASHINGTON.—Sales of natural gas by companies filing reports with the Federal Power Commission in 1949 amounted to 4.61 trillion cubic feet, according to the commission's 1949 edition of its annual publication, "Statistics of Natural Gas Companies." Operating revenues of the companies totaled $1,147,057,000 for the year. Reports were filed by 122 natural-gas companies.

FPC Sets Panhandle Rules

WASHINGTON.—A set of rules designed to govern deliveries of natural gas by Panhandle Eastern Pipeline Co. this winter, when customer demands exceed capacity and service curtailment is necessary, has been issued by the Federal Power Commission.

Summing up the plan, an FPC spokesman said that in general the industrial users will get about the same amount of gas they received last winter and other users will get slightly more.

Rules are now in effect and will remain in force until May 1, 1951, for consumers in Texas, Kansas, Missouri, Illinois, Indiana, Ohio, and Michigan. This is the fifth consecutive year that service rules have been prescribed for the Panhandle system.

New York Line 'Feasible'

WASHINGTON.—John T. Kimball, vice president of Niagara Mohawk Power Corp., has declared that a pipe line to deliver natural gas to Watertown, N. Y., and several other northeastern New York localities would be "economically feasible" in a statement before the Federal Power Commission.

The corporation seeks authority to build a 55-mile pipe line to supply the Watertown area at an estimated cost of $2,000,000. Niagara Mohawk has been serving this area with manufactured gas, and, Kimball testified, suffered a loss of about $140,000 for the year ended last June 30.

Under the plan, the company would require about 196,286,000 cu. ft. of gas in 1952 from New York State Natural Gas Corp. of New York City. The proposal has the support of the New York State Public Service Commission, according to Malcolm F. Orton, counsel for the commission.

Toronto May Get Texas Gas

TORONTO.—Natural gas from Texas may replace manufactured gas in Toronto homes, according to E. J. Tucker, vice president of Consumers Gas Co.

Tucker said that Tennessee Gas Transmission Co. had asked permission of the United States Federal Power Commission to export the gas.

It is estimated that it would require 18 months to build a planned $6,500,000 pipe line from Niagara to Toronto, provided FPC permission is granted.

Interstate Seeks New Line

WASHINGTON.—Interstate Power Co., of Dubuque, Iowa, has filed an application with the Federal Power Commission seeking authorization to construct a 26.5-mile pipe line to carry natural gas to the Clinton, Iowa, area, and an FPC order directing Natural Gas Pipeline Co. of America, Chicago, to furnish a supply of natural gas for the project.

Interstate, which now serves manufactured gas in Clinton, wants to connect its proposed line with Natural's system near Hooppole, Ill. The 26.5-mile line, to be of 8⅝-in. pipe, would then extend from the Hooppole area, with a submarine crossing of the Rock River, to a point on the east side of the Mississippi River opposite Clinton. Gas would be carried across the Mississippi through a double-submarine crossing. Estimated capital cost of the project is $749,000.

Further Hearings on Mixup

WASHINGTON.—Further hearings have been scheduled for January 4 here by the Federal Power Commission in the proceedings involving the applications of Southern Natural Gas Co. and Atlantic Gulf Gas Co. to construct natural-gas facilities to serve areas of Georgia, Florida, South Carolina, and Alabama.

Atlantic Gulf, of Shreveport, and Southern Natural, of Birmingham, both are proposing to serve substantially the same areas of these states.

Hearings on the Atlantic Gulf application were concluded October 24, with the record to remain open subject to further order of the commission. FPC said further hearings are for the purpose of receiving additional evidence as is relevant to the issues raised by the interveners opposing the application.

Natural Gasoline

L.P.G. Engine-Fuel Symposium

DETROIT.—A symposium comprising three papers on the use of liquefied petroleum gas for motor and tractor fuel is scheduled for the Society of Automotive Engineers annual meeting here January 8-12.

The role of fuel in engine development will receive attention in a paper presented by D. P. Barnard, director of research for Standard Oil Co. (Ind.), who is recipient of the Horning Memorial Medal. W. M. Holaday and D. P. Heath of Socony-Vacuum Oil Co., Inc., will report on "Trends in Motor Fuel Volatility."

Stanolind Plant to Expand

ULYSSES, Kans.—The Kansas Corporation Commission will hear an application of Stanolind Oil & Gas Co. on December 29 to more than treble capacity of its Hugoton field natural-gasoline plant in southwestern Kansas near here.

Announcing the hearing date, the commission said the company seeks authority to increase capacity from 100,000,000 cu. ft. of natural gas per day to 325,000,000.

Authority for the construction of the plant in Grant County was granted by the commission November 28, 1947.

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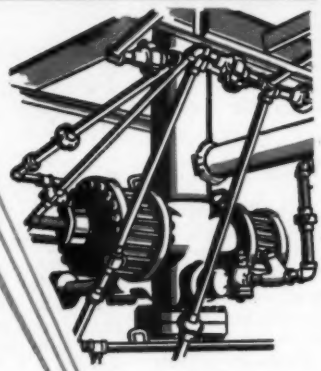
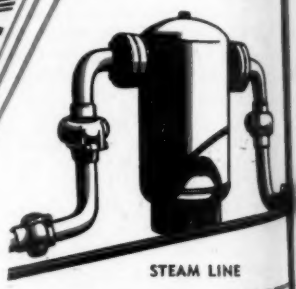
ROTARY HOSE—SWIVEL END

MUD LINES

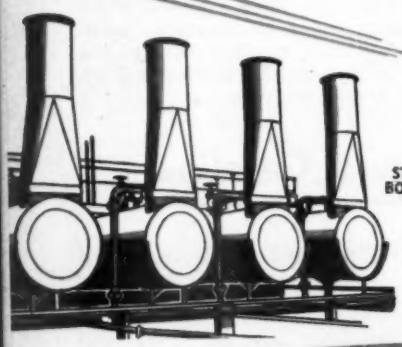


PRESSURE OPERATED BLOWOUT PREVENTER MANIFOLD

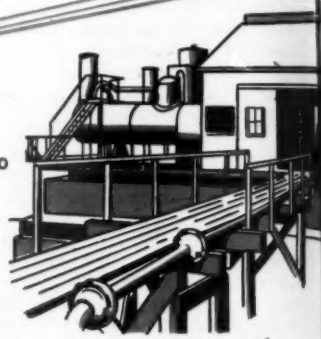
STEAM LINE SUBJECTED TO VIBRATION



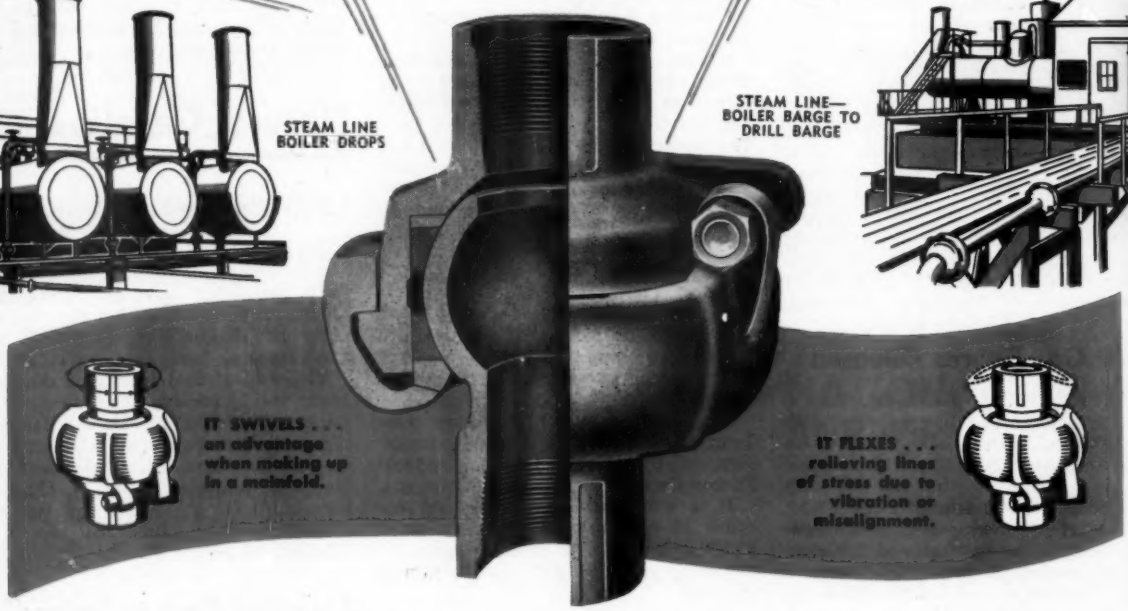
STEAM LINE



STEAM LINE BOILER DROPS



STEAM LINE—BOILER BARGE TO DRILL BARGE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PIPE LINES

Pipe-Line-Corrosion Course

A short course on practical control of pipe-line corrosion has been scheduled for February 21-23 by the Tulsa section of the National Association of Corrosion Engineers, which conducted the first school of this type last February *(The Oil and Gas Journal, March 2, 1950, page 24)*.

According to Chairman J. N. Hunter, Jr., of Service Pipe Line Co., the course is designed to serve a twofold purpose: (1) To acquaint field men with the "why" and "how" of corrosion control so that they may participate more effectively in this phase of their company's operations; (2) to acquaint corrosion engineers with various techniques for disseminating information on corrosion control to company personnel.

The course will be divided equally between field work at pipe-line locations near Tulsa and discussion-demonstration sessions at the Mayo Hotel.

Hunter will be assisted by Hugh A. Brady, Gulf Refining Co. (field work); Yale W. Titterington, Dowell Incorporated (demonstrations-discussions), Maynard H. Jackson, Middle West Coating & Supply (hotel and transportation); and T. D. Williamson, Jr., T. D. Williamson, Inc., (publicity).

The demand for such training was indicated last year by the attendance of 178 foremen, superintendents, engineers, and inspectors from all parts of the country.

Kansas Runs Pass Allowable

TOPEKA.—Pipe-line runs of Kansas crude oil averaged 307,666 bbl. daily in November, according to the Kansas Conservation Division. This was 7,666 bbl. per day above the allowable fixed for the month by the Kansas Corporation Commission.

Oklahoma Natural Projects

Oklahoma Natural Gas Co. has contracted with Trojan Construction Co. for the laying of a total of 93 miles of line on two jobs. Work is to start within a few days on the laying of 53 miles of 26-in. line from a point northeast of Edmond, Okla., to the company's underground storage 4 miles south of Depew, Okla. On completion of this job, the contractor will proceed with the laying of 40 miles of 16-in. line between Velma and Chickasha, Okla.

Construction of a 4,400 hp. compressor station is now in progress at the Depew underground storage reservoir. The building of this station is being handled by Gasoline Plant Construction Co.

A new service center is being established by Oklahoma Natural at 50th and Santa Fe, Oklahoma City, to provide facilities for warehouse, machine shop, welding shop, and local office.

Arizona Line Has Priority

EL PASO.—The projected pipe line to be constructed by El Paso Natural Gas Co. across northern Arizona has high priority as a defense project and will be built as rapidly as possible, it has been revealed by C. C. Craigin, vice president and general manager of El Paso Natural.

The company is getting a full output of steel from the Republic Steel plant in Gadsden, Ala., Craigin said.

When the line is completed, natural gas will replace about 850,000 bbl. of fuel oil per month now being used in the area. The fuel oil thus released will go to the Navy and Air Force in California.

Kansas-Nebraska Work

Kansas-Nebraska Natural Gas Co. has a program for laying 279 miles of loops, replacements, and extensions which is expected to be in the construction stage in March or April. Specifications will be issued in February, if Federal Power Commission authorization is granted in January.

The company's 1951 undertakings, scheduled for completion during the year, include 219 miles of extensions and 78 miles of loops and replacements.

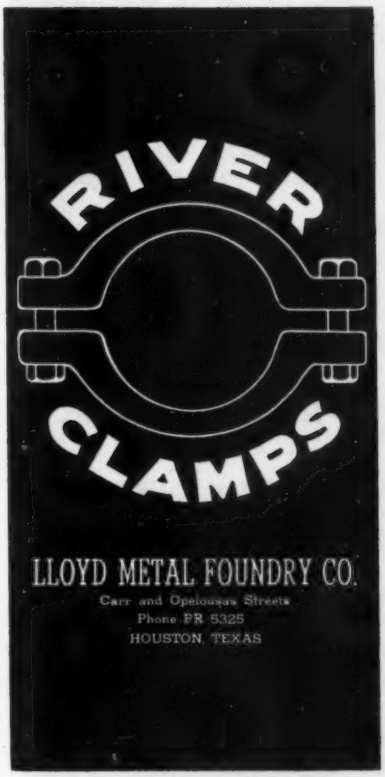
Great Falls Lines Completed

GREAT FALLS, Mont. — A second natural-gas pipe line into Great Falls has been completed and placed in operation by Montana-Dakota Utilities Co. expanding this city's hookup with gas areas to the north, according to an announcement by Harlan Scott, division manager of the company.

Twenty-one miles of solidly welded 12-in., 800-lb. pressure-test pipe have been laid and put into continuous service. This is about two times the maximum operating pressure that will be used.

Purpose of the new line is to satisfy a growing demand in the city for an adequate supply of the fuel. The line will have the effect of reducing to a minimum the possibility of any future interruption of service, Scott said.

The project duplicates the southern one-third of the original line from the compressor plant at the field. If



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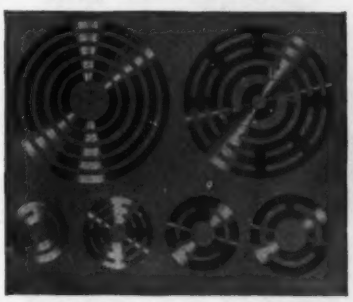

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a break should occur north of the new 21-mile loop, check valves would trap the gas in the 42 miles or more of pipe south of the break. The amount of gas thus trapped would be adequate to supply city needs until the break could be repaired. Future plans call for eventual duplication of the entire line.

Latest type of cathodic protection against corrosion was installed on the line, as well as a mobile-radio system for communication with trucks of maintenance and repair crews.

Pipe-Line Contract Let

CORPUS CHRISTI.—Algelt Construction Co. of this city has been awarded contract to lay an 8-in. gas pipe line 67 miles long from the Lopeno gas field, Zapata County, to a new electric power plant.

The new $4,500,000 power plant of Central Power & Light Co. is now under construction just north of Laredo on the Rio Grande River. Work on the pipe line is expected to start in mid-January and to be completed by March 20. Right-of-way is now being secured for the project, which is estimated to cost $1,000,000.

Tapline Station Housing

Desert conditions along the route of the 1,068-mile system built this year by Trans-Arabian Pipe Line Co. required special provisions for housing employes at pump stations.

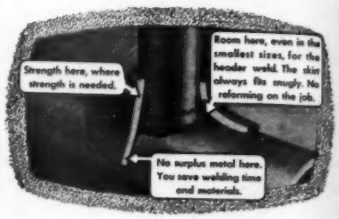
Attractive, well-insulated, prefabricated houses were installed in a unique manner. These houses were assembled at a Persian Gulf base, then shipped by truck to the pump stations, some of them several hundred miles away across the desert. During the journey each house carried its own furniture, refrigerators, air-conditioning facilities, stove, plumbing, etc., so that on arrival it was ready for housekeeping.

Barracks, family houses, and other similar buildings at all stations are heated by lines from a central boiler plant. At the three easternmost diesel stations—Nariya, Qaisumah, and Rafha, these structures will be cooled in the summer months by water from a central air-conditioning plant. Equipment for these stations is described in an article on page 71 of this issue.

Mark Set in October Run

LAKE CHARLES.—A new high in the history of Cities Service Pipe Line Co.'s Sour Lake-Lake Charles pipe-line runs was marked up in October when runs through the line exceeded the 2,000,000-bbl. mark. The line serves the big Cities Service Refining Corp. and Cit-Con lube refinery.

FLEET-LINE*
FORGED STEEL WELDING
PIPE SADDLES
ASTM A234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Pipe-Line Construction

FOLLOWING is a tabulation of pipeline projects which are planned or under construction. Included are crude-oil, products, and natural-gas lines. The list was compiled from surveys made by The Oil and Gas Journal.

Crude-Oil Pipe Lines

Gulf Refining Co., Tulsa Pipe Line Division.—72 miles, 6-in., under way, El Dorado, Kans., to Webb City, Okla.; Pipeline Service Co., contractor. J. W. Welcher, Atlanta, Kans., spreadman.

Lakehead Pipe Line Co., Inc. (American subsidiary of Interprovincial Pipe Line Co., Canada).—321 miles, 18-in., contracted Neche, N. D., to Superior, Wis., to be completed October 1950; Anderson Bros., contractor.

Ohio Oil Co.—54 miles, 20-in., underway in Illinois; Betchel Corp., contractor; S. D. Betchel, Jr., superintendent.

Pan American Pipe Line Co.—80 miles, 10-in., under way, from southern part of Scurry County, Texas, to a connection with Humble pipe line near San Angelo, Tex.; Brown & Root, contractor.

Pelican Oil Co.—60 miles, 6-in., under way, Lake Charles to DeQuincy, La.

Phillips Pipe Line Co.—50 miles, 6-8-in., under way, Phillips tank farm, Sweeny, Tex., to Humble's Webster Station, Galveston County, Texas; O. R. Burden Construction Co., contractor; B. C. Barney Hall, spreadman.

Phillips Pipe Line Co.—25 miles, 8-in., considered, loops between Thrall and Kansas City, Kans.

Platte Pipe Line Co.—1,080 miles, 16-20-in., planned, Worland, Wyo., to Wood River refining area in Illinois.

Portland Pipe Line Co. (Montreal Pipe Line Co., Ltd.).—236 miles, 18-in., contracted, ortland, Me., to Montreal, Que., Canada.

Portland Pipe Line Co. (Montreal Pipe Line Co., Ltd.).—85 miles, 18-in., under way, Portland, Me., to Gorham, N. H.; Oklahoma Contracting Co., contractor of Section 1; H. A. Waylie, Westbrook, Me., superintendent.

Portland Pipe Line Co. (Montreal Pipe (Canada).—321 miles, 18-in., contracted, Gorham, N. H., to international boundary near N. Troy, Vt.; Associated Pipeline Contractors, Inc., contractor of Section 2. Lacy Walker, Barton, Vt., spreadman.

Portland Pipe Line Co. (Montreal Pipe Line Co.).—68 miles, 18-in., contracted, Canadian boundary to Montreal; Fred Mannix, contractor of Section 3.

Service Pipe Line Co.—25 miles, 8-in., under way, Beaver Creek and Riverton, Wyo.; Vaughn & Taylor Construction Co.

Shell Pipe Line Corp.—39 miles, 10-in., under way, McCamey to Kemper, Tex.; McVean & Roberts, contractor.

Texas-New Mexico Pipe Line Co.—16½ miles, 10-in., under way, Scurry County, Texas; O. R. Burden, contractor, Bill Price, spreadman.

West Coast Pipe Line Co.—20-in., planned, Permian basin, West Texas, to California.

Products Pipe Lines

Great Lakes Pipe Line Co.—39 miles, 12-in., under way, Hawarden, Iowa, to Sioux Falls, S. D.; Midwestern Constructors, Inc., contractor, R. C. Stanley, Canton, S. D.

Great Lakes Pipe Line Co.—355 miles, 12-in., authorized, Kansas City through Omaha and Sioux City, Iowa, to Sioux Falls, S. D.

Phillips Petroleum Co.—281 miles, 10-in., proposed, Borger, Tex., to Yale, Okla.

Phillips Petroleum Co. and Shamrock Oil & Gas Co.—155 miles, 6-in., planned, extension on 600-mile line at Phillips, Tex., via La Junta, to Denver.

Plantation Pipe Line Co.—432 miles, 14-18-in., Baton Rouge to Bremen, Ga.—to Charlotte, N. C., Williams Brothers Co., contractor. Completion scheduled by end of 1951.

Pure Transportation Co.—100 miles, 6-in., proposed, Heath to Dayton, Ohio.

Salt Lake Pipe Line Co.—242 miles, 6-8-in., under way, Boise, Idaho, to Pasco, Wash. Completion date, December 1950.

Salt Lake Pipe Line Co.—140 miles, 8-in., contracted Boise, to Baker, Idaho; Bechtel Corp., contractor.

Salt Lake Pipe Line Co.—Contracted, Macco Corp., and Morrison-Knudson Co., Inc.

Salt Lake Pipe Line Co.—120 miles, 6-8-in., under way, Baker, Ore., to Pasco, Wash. Completed August 8, 1950; Pacific Pipeline & Engineers, Ltd., contractor, L. E. Robertson, LaGrande, Ore., spreadman.

Standard Oil Co. (Ohio) and Shell Oil Co.—56 miles, 8-in., under way, Lima to Springfield, Ohio; Tulsa Construction Co., contractor.

Susquehanna Pipe Line Co.—126 miles, 8⅝-in., under way, Toledo, Ohio, to Sarnia, Ont., Canada; H. L. Gentry Construction Co., contractor. James Mitchell, Toledo, Ohio, spreadman.

Natural-Gas Pipe Lines

Acme Natural Gas Co.—25½ miles, 10-in., contracted, Ellwood to Butler, Pa., to be completed December 15, 1950; Williams-Austin Co., contractor. Howard Bauer, Butler, Pa., spreadman.

Alabama-Tennessee Natural Gas Co.—35 miles, 8-in., authorized, Muscle Shoals to Decatur, Ala.

Atlantic Gulf Gas Co. (United Gas Pipe Line Co.).—1,530 miles, planned, Alabama-Florida-Georgia-South Carolina.

Central Kentucky Natural Gas Co.—42 miles, 20-in., under way, North Means compressor station to Foster, Ky; completion date December 15, 1950; Williams-Austin Co., contractor, Leman Creech, Mt. Sterling, Ky., spreadman.

Chicago District Pipe Line Co.—41 miles, 24-in., authorized, loop Calumet pipe line—Joliet, Ill., to Chicago, completion date December 1950.

City of Indianapolis, Inc.—22 miles, 16-in., proposed, Indianapolis to Panhandle Eastern Corp. system.

Coast Counties Gas & Electric Co.—40 miles, 3-4-8-in., considered, coast and valley region, California.

Coastal Pipe Line Co.—1,000 miles, planned, Texas to Norfolk, Va.

Commonwealth Natural Gas Corp.—84 miles, 12-in., contracted, Richmond to Newport News, Va.; Ray L. Smith, contractor.

Commonwealth Natural Gas Co.—20 miles, 8-in., contracted, James River to Newport News, Va.; Ray L. Smith, contractor.

Commonwealth Natural Gas Corp.—104 miles, 18-in., under way, Standardsville to near Petersburg, Va.; Ray L. Smith & Son, contractor, Don C. Smith, Orange, Va., spreadman.

Commonwealth Natural Gas Corp.—537 miles, 20-in., proposed, West Bend, Ky., to Norfolk, Va.

Consolidated Gas Utilities Corp.—41 miles, 12-in., planned, Enid to Blackwell, Okla., Marlow to Cement, Okla.

East Ohio Gas Co.—34 miles, 20-in., authorized, northeastern Ohio to near Petersburg to East Ohio's Austintown station near Youngstown.

East Tennessee Natural Gas Co.—100 miles, planned, lateral to be laid in 1950.

East Tennessee Gas Corp.—150 miles, 16-in., under way, Knoxville to Bristol, Tenn.

East Tennessee Natural Gas Co.—398 miles, 3-16-in., planned, Nashville to Chattanooga to Knoxville, Tenn., and laterals.

East Tennessee Natural Gas Co.—106 miles, 12-16-in., contracted, Lobelville to Tulla-

Sometimes The Going's

ROUGH

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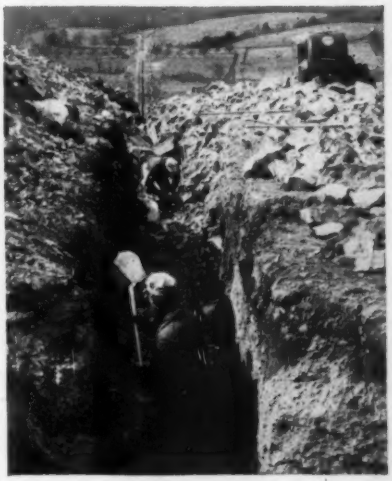
The Terrain Oklahoma Contracting Corp. has tackled in building the nation's Pipelines has been rough. Yes, Plenty Rough — But they always get the job done. Oklahoma Contracting is completing a third of a century as the Oldest Pipeline Contractor in America.



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homa, Tenn.; Oman Construction Co., contractor.

East Tennessee Natural Gas Co.—130 miles, 12-in., under way, Athens, via Chattanooga, to Tullahoma, Tenn.; N. A. Saigh Co., Inc.

East Tennessee Natural Gas Co.—120 miles, 12-in., planned, Chattanooga to Knoxville, Tenn.; Walters & Saigh Construction Co.

East Tennessee Natural Gas Co.—185 miles, 16-in., planned, Lobelville to Chattanooga, Tenn., Walters & Saigh Construction Co.

Eastern Natural Gas Corp.—292 miles, 24-in., proposed, Phoenixville, Pa., via New Haven and Hartford, Conn., Providence, R. I., Springfield, Mass., and Boston.

Egyptian Natural Gas Co.—80 miles, 6-8-in., planned, Norris City to Salem-Centralia, Ill., area.

El Paso Natural Gas Co.—352 miles, 30-in., under way, looping of 26-in., New Mexico-California line and connection with Pacific Gas & Electric Co. at Needles, Calif., to be completed November 1950.

El Paso Natural Gas Co.—450 miles, 24-in., authorized, San Juan basin, New Mexico, to Franconia, Ariz., to be completed November 1951 by company crews.

Home Gas Co.—70 miles, planned, Orange, Sullivan, Rockland, and Cattaraugus counties, New York.

Humble Oil & Refining Co.—50 miles, 8-10-12-in.; Trawick field to near Longview, Tex.; Trojan Construction Co., contractor.

Jersey Central Power & Light Co.—39 miles, 10-in., planned, New Jersey coast system of Texas Eastern Transmission Co.'s Big Inch.

Lion Oil Co.—60 miles, 6-2-in., gas gathering system in Scurry County, Texas. George Tucker Pipe Line Construction Co., contractor. J. O. Carter, spreadman.

Magnolia Petroleum Co.—60 miles, 4-24-in., gathering system in LaWard and Lolita fields, Texas; Henry L. Lemons & Co., contractor. W. A. Remington, spreadman.

Michigan Gas Storage Co.—150 miles, 20-in., planned, Chelsea terminal-Winterfield and Cranberry Lake, Mich.; Mahoney Contracting Co., contractor.

Michigan-Wisconsin Pipe Line Co.—117 miles, 6-18-in., under way, Milwaukee to Green Bay and Two Rivers, Wis.; G. G. Griffis Construction Co., contractor. F. K. Egan, Fond du Lac, Wis.

Mississippi River Fuel Corp.—40 miles, 18-in., authorized, Dubach to Perryville, La.

Montana-Dakota Utilities Co. and Montana-Wyoming Gas Pipe Line Co.—335 miles, 12¾-in., under way, Worland, Wyo., to Baker, Mont.; R. A. Conyes Construction Corp., contractor. Al Poggi, Hardin, Mont., superintendent.

New York State Natural Gas Corp.—41 miles, 20-in., Ohio-Pennsylvania line to Bakerstown, Pa.; Tulsa-Williams Co., contractor. O. L. Martin, Darlington, Pa., spreadman.

New York State Natural Gas Corp.—31 miles, 20-in., under way, Tonkin station to Bakerstown, Pa., to be completed December 1, 1950; Williams-Austin Co., contractor. Ralph Gaddy, New Kensington, Pa., spreadman.

New York State Natural.—164 miles, 18-in., planned, Ithaca to Albany, N. Y.

New York State Natural Gas Corp.—70 miles, 20-in., planned, North Oakford, Pa., to Ohio state line.

Niagara Mohawk Power Corp.—85½ miles, 26-in., contracted, ten loops from Texas to northern Iowa.

Northern Natural Gas Co.—597 miles, 26-26-in., contracted, ten loops from Texas to northern Iowa.

Northern Natural Gas Co.—76 miles, 4 to 12-in., under way, gathering line in vicinity of Hugoton, Kans., Cheek Construction Co., contractor, Troy Cheek, Ulysses, Kans., superintendent.

Northern Natural Gas Co.—111 miles, 34-in., under way, Ogden, Iowa, to St. Paul, Minn.; R. B. Potashnick, contractor.

Northern Natural Gas Co.—75 miles, 26-

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ECONOMY use . . .

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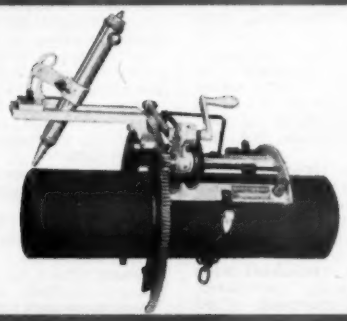
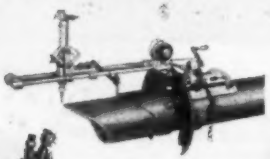
BEVELING MACHINE



ATTACHMENTS



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economy . . . You'll soon save several times the cost of the machine in labor, gas and transportation charges. H&M takes approximately one-half the labor and gas to make the cut as hand cutting and the work is all done in the field.

portability . . Bring this light (24 to 155 pounds) but durable machine to the pipe instead of moving the heavy pipe to the machine. Remember, H&M designs for SPEED and ECONOMY.

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in., under way, north of Beaver, Okla.; R. H. Fulton & Co., contractor of Loop 2. Merele Lewellen, Mead, Kans., spreadman.

Northern Natural Gas Co.—33 miles, 26-in., contracted, Mullinville, Kans., station; R. H. Fulton & Co., contractor of Loop 3.

Northern Natural Gas Co.—72½ miles, 26-in., under way, Bushton to Minneapolis, Kans.; R. H. Fulton & Co., contractor of Loop 4. M. L. Boyd, Salina, Kans., spreadman.

Northern Natural Gas Co.—155 miles, 20-in., contracted, Garden City to Bushton, Kans.; R. H. Fulton & Co., contractor of Loop 5. Jerry Nash, Garden City, Kans., spreadman.

Northern Natural Gas Co.—43 miles, 26-in., under way, Palmyra, Neb., station to Oakland, Iowa, station; Midwestern Construction Co., Inc., contractor of Loop 6. M. T. Wilhite, superintendent.

Northern Natural Gas Co.—31 miles, 26-in., under way, north of Ogden, Iowa; R. B. Potashnick Co., contractor of Loop 8. H. F. Carr, Ventura, Iowa, spreadman.

Northern Natural Gas Co.—41 miles, 26-in., contracted, northward from Ventura, Iowa, station; R. B. Potashnick Co., contractor of Loop 9.

Northern Natural Gas Co.—40 miles, 26-in., contracted, Ventura, Iowa, station; R. B. Potashnick, contractor of Loop 10.

Northern Natural Gas Co.—222 miles, 26-in., under way, Borger, Tex., to Nebraska line; R. H. Fulton & Co., contractor. M. C. Boyd, Ashland, Kans., spreadman.

Northwest Natural Gas Co.—750 miles, planned, Washington, Oregon, and Idaho.

Ohio Fuel Gas Co.—22 miles, 16-in., authorized, Dayton, Troy, Piqua, and Sidney, Ohio.

Pacific Gas & Electric Co.—47 miles, 8-in., authorized, Salinas to Kilig City, Calif.

Pacific Lighting Corp.—23 miles, 30-in., planned, Inglewood to Encino, Calif.

Pacific Lighting Corp.—41 miles, 30-in., planned, Puente to March Field, California, to be completed 1950.

Pacific Northwest Pipe Line Co.—400 miles, 22-in., gathering lines on Texas Gulf Coast to Pacific Northwest pipe line.

Pacific Northwest Pipe Line Corp.—2,175 miles, 26-in., authorized, Texas Gulf Coast to Pacific Northwest.

Panhandle Eastern Pipe Line Co.—356 miles, 26-in., authorized, looping in Texas, Oklahoma, Kansas, Missouri, Illinois, Indiana, Ohio, and Michigan.

Phillips Petroleum Co.—99 miles, 3-16-in., under way, Sherman and Hansford counties, Texas, gas-gathering system; Vaughn & Taylor Construction Co., Inc., Dumas, Tex.

Piedmont Natural Gas Co.—1,350 miles, 16-in., planned, Greenville, Miss., to Carolinas.

Plains Natural Gas Co.—120 miles, 4-24-in., contracted, Oklahoma-Kansas area, Hugoton field, gathering system; Midwestern Constructors, Inc., (Arey-Phillips Construction Co.) contractor. T. S. Nunley, Liberal, Kans., chief inspector.

Potomac Gas Co.—18 miles, 16-in., planned, Dranesville to Arlington, Va.

Prince George's Gas Corp.—20 miles, 22-in., authorized between Chillum and Rockville, Md.

Roanoke Pipe Line Co.—30 miles, 8-in., authorized, Gala, Va., to Roanoke.

San Diego Gas & Electric Co.—53 miles, 16-in., planned, San Diego County, California.

San Diego Gas & Electric Corp. (Southern Counties Gas Co.)—85 miles, authorized, San Diego, Riverside, and Moreno, California.

South Central Alabama Natural Gas Co., Inc.—150 miles, proposed, central Alabama.

South Georgia Natural Gas Co.—248 miles, planned.

South Jersey Gas Co.—75 miles, 10-12-14-in., under way, Pleasantville, N. J., to Bustleton, Pa.; G. G. Griffis, Inc., contractor, Ray Abney, Millville, N. J., spreadman.

South Jersey Gas Co.—14-in., under way, Franklinville to Bridgeton, N. J.; G. G. Griffis, Inc., contractor.

Southwestern Michigan Gas Co.—55 miles, 12¾-in., proposed, Oakland County to Marysville, Mich.

Southern California Gas Co.—83 miles, 30-in., under way, Whitewater, Riverside County, to Puente, Los Angeles County, California; Midwestern Constructors, joint contract with Johnson Western Gunite—L. E. Dixon. John Work, Banning, Calif., superintendent.

Southern Counties Gas Co. of California.—81 miles, 20-in., authorized, looping.

Southern Natural Gas Co.—32 miles, 16-in., under way, Wetumpka to Tallassee, Ala.; completion due December 1; Sheehan Pipe Line Construction Co., contractor, C. M. Brown, spreadman.

Southern Natural Gas Co.—180 miles, 18-in., under way, Gwinville, Miss., to Selma, Ala.; Sheehan Pipe Line Construction Co., contractor. Jim Brown, Meridian, Miss., spreadman.

Southern Natural Gas Co.—24 miles, 24-in., under way, loops to Mississippi, Alabama, Georgia; Sheehan Pipe Line Construction Co., contractor. Jim Brown, R. H. Brown, spreadmen.

Southern Natural Gas Co.—85 miles, 18-in., under way, Mississippi-Alabama state line to Selma, Ala.; completion due November 15; Sheehan Pipe Line Co., contractor C. M. Brown, spreadman.

Southern Natural Gas Co.—161 miles, 16-18-in., under way, Selma, Ala., to Elmore, Ala. Associated Pipeline Contractors, Inc., contractor. Lacy Walker and L. H. Gray, spreadmen.

Southern Natural Gas Co.—110 miles, 11-in., considered, extension.

Southern Natural Gas Co.—118 miles, 13-in., planned, extension.

Southern Natural Gas Co.—138 miles, 20-22-in., planned, Chattanooga, Tenn., to Lexington, Miss.

Southern Natural Gas Co.—171 miles, 16-planned, extension.

Southern Natural Gas Co.—225 miles, 16-in., planned, Colfax, Ga., extension.

Southern Natural Gas Co.—314 miles, 18-in., planned, extension.

Southern Natural Gas Co.—375 miles, 24-

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Mounted on Arched
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Feature to
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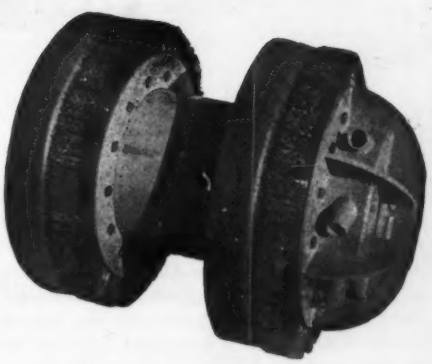

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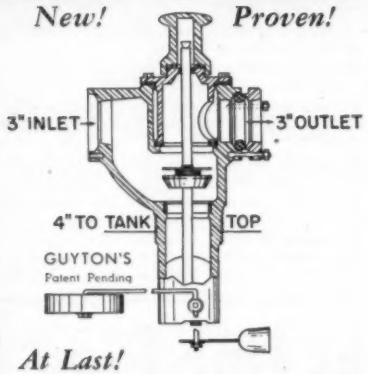

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in., planned, Gwinville, Miss., to Atlanta Ga.

Southern Union Gas Co.—78 miles, 8-10 14-in., planned, New Mexico loops and laterals.

Sunray Oil Corp.—133 miles, 3-30-in., system for Snyder gasoline plant, Vaughn & Taylor Construction Co., contractor. D. D. Vaughn, spreadman.

Tennessee Gas Transmission Co.—102 miles 16-in., under way, Bayou Sale to Kinder La.; Latex Construction Co., contractor H. L. Leake, superintendent.

Tennessee Gas Transmission Co.—700 miles, 20-26-in., planned, Burnaugh, Ky., to Massachusetts including 400-mile line to Buffalo.

Tennessee Gas Transmission Co.—95 miles 20-in., under way, Natchitoches to Kinder La.; Latex Construction Co., contractor F. A. Silar, superintendent.

Tennessee Gas Transmission Co.—992 miles 30-in., planned, first 150 miles of loops to be laid at Monroe, La., Greenville, Miss., Midland and Portland, Tenn.

Tennessee Gas Transmission Co.—70 miles, 26-30 in., contracted, between Stations 104 and 110; Anderson Brothers Corp., contractor. E. C. McCoy and Arkie Hobson, Richmond, Ky., spreadmen.

Tennessee Gas Transmission Co.—174 miles. 30-in., under way, western Tennessee and Kentucky; Price-Morrison, contractor. Jack Hodges and R. L. McMillon, superintendents.

Tennessee Gas Transmission Co.—74 miles. 30-in., under way, from near Glasgow northeastward to near Lebanon, Ky; Morrison Construction Co., contractor. R. L. McMillon, Adamsville, Tenn., spreadman.

Tennessee Gas Transmission Co.—28 miles, 30-in., under way, near Scottsville, southwestward to near White House, Tenn.; Morrison Construction Co., contractor. R. L. McMillon, Adamsville, Tenn., spreadman.

Tennessee Gas Transmission Co.—99 miles. 30-in., under way, near Dickson, southwestward to near Selmer, Tenn.; H. C. Price. contractor. Jack Hodges, Linden, Tenn. spreadman.

Tennessee Gas Transmission Co.—170 miles 26-30-in., contracted, Kentucky; Anderson Brothers Corp., contractor.

Texas Eastern Transmission Corp.—1,400 miles, 26-in., planned, Texas to Pittsburgh loops.

Texas Gas Transmission Corp.—33 miles 12-in., authorized, Slaughters, Ky., to Evansville, Ind.

Texas Gas Transmission Corp.—723 miles 26-in., under way, Lisbon, La., to Middletown, Ohio.

Texas-Illinois Natural Gas Pipeline Co.—58 miles, 20-in., lateral from Joliet terminal to connection with Natural Gas Pipeline Co. of America near Volo, Ill.

Texas-Illinois Natural Gas Pipeline Co.—1,300 miles 30-in., under way, Corpus Christi area to Joliet, Ill.

Texas-Illinois Natural Gas Pipeline Co.—100 miles, 26-in., La Gloria to Refugio, Tex.; Midwestern Constructors, Inc., contractor of Schedule 1. M. T. Wilhite, superintendent.

Texas-Illinois Natural Gas Pipeline Co.—100 miles, 30-in., under way, Mississippi River to Effingham, Ill.; Midwestern Constructors, Inc., contractor of Schedule 11. R. C. Stanley, superintendent.

Texas-Illinois Natural Gas Pipeline Co.—100 miles, 30-in., to start in 1951, Effingham to Sibley, Ill.; Midwestern Constructors, Inc., contractor to Schedule 12.

Texas-Illinois Natural Gas Pipeline Co.—92 miles, 30-in., to start in 1951; Sibley to Joliet, Ill.; Midwestern Constructors, Inc., contractor of Schedule 13.

Texas-Illinois Gas Pipe Line Corp.—400 miles, 30-in., contracted, Arkansas and Missouri; Bechtel Corp. A. M. Berlander, general superintendent.

Texas-Illinois Gas Pipe Line Corp.—120 miles, 30-in., contracted; H. C. Price, contractor. Work under way.

Texas-Illinois Gas Pipe Line Corp.—110 miles, 30-in., contracted; H. C. Price, contractor. Work under way.

Texas-Illinois Gas Pipe Line Corp.—87

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miles, 36-in., contracted; H. C. Price, contractor. Work under way.

Texas-Illinois Gas Pipe Line Corp.—36 miles, 24-in., contracted; H. C. Price, contractor. Work under way.

Texas-Illinois Gas Pipe Line Corp.—38 miles, 12-in., contracted; H. C. Price, contractor. Work under way.

Transcontinental Gas Pipe Line Corp.—1,840 miles, 30-in., under way, Rio Grande Valley, Texas, to New York City.

Transcontinental Gas Pipe Line Corp.—90 miles, 10-14-in., underway, Mercedes to south of Falfurrias, Tex.; Massey Construction Co., contractor of Schedule A.

Transcontinental Gas Pipe Line Corp.—108 miles, 24-in., under way, south af Falfurrias to Edna, Tex.; H. B. Zachry Co., contractor of Schedule B.

Transcontinental Gas Pipe Line Corp.—93 miles, 30-in., under way, Porters to Deweyville, Tex.; Texas Southern Contracting Co., contractor of Schedule D. Merle Tatum, Liberty, Tex., spreadman.

Transcontinental Gas Pipe Line Corp.—81 miles, 30-in., under way, Sabine River, to Eunice, La.; Anderson Bros. Corp., contractor of Schedule E.

Transcontinental Gas Pipe Line Corp.—100 miles, 30-in., under way, Catawba River, North Carolina, to North Carolina-Virginia boundary; R. H. Fulton & Co., contractor of Section 9. A. A. Corrigan and Clark Williams, superintendents.

Transcontinental Gas Pipe Line Corp.—86 miles, 30-in., under way, North Carolina-Virginia boundary to James River, Virginia; O. R. Smith Contracting Corp., contractor of Section 10. R. M. Jones, Altavista, Va., spreadman.

Transcontinental Gas Pipe Line Corp.—110 miles, 30-in., under way, James River, Virginia, to Potomac River, Virginia; O. R. Smith Contracting Corp., contractor of Section 11. C. C. Craig, Herndon, Va., spreadman.

Transcontinental Gas Pipe Line Corp.—75 miles, 30-in., contracted, Potomac River to Susquehanna River; Associated Pipe Line Contracting, Inc., contractor of Section 12. Cecil Rogers, Towson, Md., spreadman.

Transcontinental Gas Pipe Line Corp.—90 miles, 30-in., contracted, Susquehanna Pa., to Delaware River; Wunderlich & Griffis Construction Co., contractor of Section 13.

Transcontinental Gas Pipe Line Corp.—61 miles, 30-in., contracted, Delaware River to Hackensack River, New Jersey; Wunderlich & Griffis Construction Co., contractor of Section 14.

Transcontinental Gas Pipe Line Corp.—23 miles, 30-in., under way, Edgewater to Elizabeth, N. J.; Oklahoma Contracting Co., contractor to Schedule 15. Louis Visentine, Edgewater, N. J., superintendent.

Transcontinental Gas Pipe Line Corp.—98 miles, 6-14-in., under way, Wharton, Tex., area; Altgelt Construction Co., contractor, Texas Unit 1.

Transcontinental Gas Pipe Line Corp.—58 miles, 4-14-in., under way, El Campo, Tex., area; T & R Construction Co., contractor, Texas Unit 1.

Transcontinental Gas Pipe Line Corp.—38 miles, 4-8-in., under way, Sinton, Tex., area, Shanks & Eustace, Inc., contractor, Texas Unit 2.

Transcontinental Gas Pipe Line Corp.—61 miles, 6-10-in., under way, Dix, Tex., area; Victoria Oil Field Maintenance Co., contractor, Texas Unit 2.

Transcontinental Gas Pipe Line Corp.—50 miles, 18-20-in., under way, Eunice, La., to the south; Texas Southern Contracting Co., contractor, Texas Unit 2. Jim Reed, Crowley, La., spreadman.

Transcontinental Gas Pipe Line Corp.—380 miles, 8-16-in., planned, laterals to gas field.

Transcontinental Gas Pipe Line Corp.—85 miles, 4-14-in., under way, South Louisiana; Latex Construction Co., contractor. J. B. Latham, Vinton, La., spreadman.

Transcontinental Gas Pipe Line Corp.—78 miles, 30-in., contracted, Delaware River to southwest; Ray L. Smith & Son, Inc., contractor. Joe L. Work, Newton, Pa., spreadman.

Trunkline Gas Co.—278 miles, 20-in., contracted, Valley of Texas; R. H. Fulton & Co., contractor.

Trunkline Gas Co.—18 miles, 26-in., contracted, Mississippi, Tennessee, and Kentucky; R. H. Fulton & Co., contractor.

Trunkline Gas Supply Co.—1,775 miles, 10-26-in., planned, includes 740-mile, 26-in., Lake Charles, La., to Tuscola Station of Panhandle Eastern Pipe Line Co., and 1,035 miles, 10-24-in., Lake Charles, La., to McAllen, Tex., completion due October 1, 1952.

Trunkline Gas Supply Co.—176 miles, 26-in., under way, Darnell, La., to Longville, La.; Houston Contracting Co., contractor of Section A, main line. E. C. Norris, Olla, La., spreadman. W. H. Hayes, spreadman, De Ridder, La.

Trunkline Gas Co.—180 miles, 26-in., contracted, Darnell, La., to Senatobia, Miss.; Anderson Bros. Corp., contractor, Section B, main line.

Trunkline Gas Supply Co.—184 miles, 26-in., under way, Senatobia, Miss., to Paducah, Ky.; R. H. Fulton & Co., contractor of Section C, main line. Ed Veach, Memphis, Tenn., spreadman.

Trunkline Gas Co.—186 miles, 26-in., contracted, Joppa to Tuscola, Ill.; Mahoney Contracting Co., contractor of Section D, main line.

Trunkline Gas Co.—262 miles, 20-in., contracted, McAllen to Altair, Tex.; R. H. Fulton & Co., contractor of Section E and F, lateral lines.

Trunkline Gas Co.—217 miles, 24-in., contracted, Longville, La., to Altair, Tex.; Anderson Bros. Corp., contractor of Sections G and H, lateral line.

Trunkline Gas Supply Co.—71 miles, 20-16-10-in., contracted, Longville, La., south; Houston Contracting Co., contractor of Section 1, lateral line.

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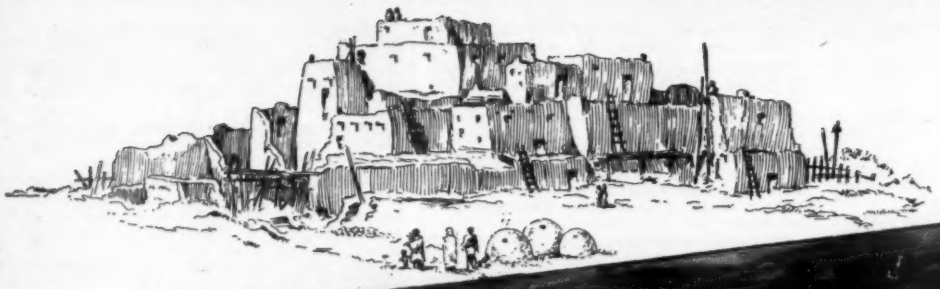

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*ARDMORE, OKLAHOMA	REFUGIO, TEXAS
*BRECKENRIDGE, TEXAS	*SAN ANGELO, TEXAS
CASPER, WYOMING	SAN ANTONIO, TEXAS
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Among the Drilling Contractors

Longhorn Has Contract For 12,000-Ft. Wildcat

Longhorn Drilling Corp., San Antonio and Three Rivers, Tex., has the contract for a 12,000-ft. wildcat test to be drilled for Western Natural Gas Co. on St. Charles Peninsula in Aransas County, Texas Gulf Coast. The location is on the St. Charles ranch and approximately 3½ miles north of St. Charles gas field. The test is Western Natural's No. 13 on the ranch.

Another new contract for this contractor is for a 7,000-ft. test to be drilled for Union Producing Co. in McMullen County, South Texas. The location is on the George T. Jambers lease in Block 42, James Freal Survey.

Operating Rotary Rigs Drop Only 3 from Peak

Rotary rigs operating in the United States and Western Canada during the week ended December 18 totaled 2,518, a decline of only three from the all-time record set the preceding week. There was an appreciable slackening of drilling activity in the Illinois Basin area and some additional slowing of work on the Gulf Coast but this was largely offset in the regional totals by gains in other areas.

Increased drilling activity in Oklahoma boosted the total number of operating rotary rigs in that state to 323, the greatest number on record, and an increase of 14 over the total of the previous week. There was an increase of 17 in the number of rigs running in the West Texas-New Mexico area. This put the total there back above the 800 mark after 2 were reported running, an increase of 9 over the preceding week, and a new all-time peak.

ROTARY RIGS IN OPERATION

(United States and Western Canada)

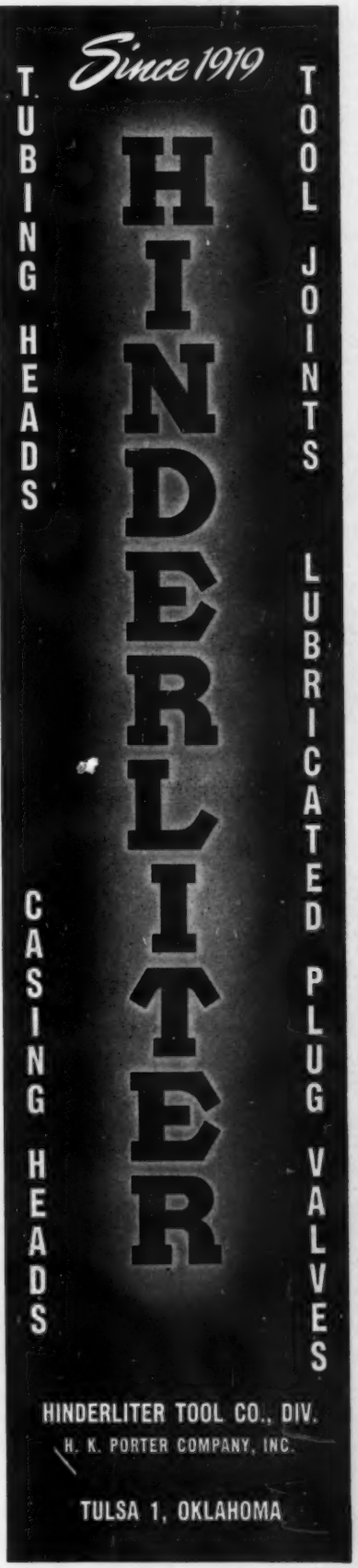
Area—	Week ended 12-18-50	Change week ended 12-11-50	Change week ended 12-19-49
Gulf Coast	584	—19	+ 53
W. Tex.-N. M.	804	+17	+ 95
Ark.-N. La.-E. Tex.	161	— 2	+ 1
Oklahoma	323	+14	+ 62
Kansas-Nebraska	169	+ 8	+ 33
Illinois-Eastern	108	—30	— 33
Rocky Mountains	114	0	+ 29
Pacific Coast	132	0	— 14
Total U. S.	2,395	—12	+226
Western Canada	123	+ 9	+ 40
Total	2,518	— 3	+266

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States as a whole and in the Pacific Coast and Illinois-Eastern areas are shown by charts on pages 118 and 119.

Wolfe Drilling Co., Tulsa, will drill Mid-Continent Petroleum Corp.'s first test in the recently opened West Belmont pool, west of Prague, Lincoln County, Oklahoma. The new test, 1 Bartodej, SW NW SE 32-12n-5e, will offset the discovery well, completed by Anderson-Prichard Oil Corp. in October. The latter produces from the second Wilcox sand at 5,030-53 ft.

Thomas J. Carter Co., Dallas, will be the contractor on a projected 4,500-ft. wildcat test which Globe Oil &

On the floor of a heavy-duty rig which Columbia Drilling Co. of Houston is operating in the Barbers Hill field, Chambers County, Texas Gulf Coast. Left to right: P. F. Cravers, toolpusher; D. D. Bagwell, driller; A. G. Riley, derrickman; R. J. Bagwell and J. J. Stoval, floormen.



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Refining Co. is starting at 1-N State, NW SW SE 13-1n-9w, 2½ miles southeast of Nellie, Stephens County, southern Oklahoma.

C. V. Claypool, Owensboro, Ky, is starting a wildcat test for P. H. Gray in Breckenridge County, Kentucky. Cable tools are being used. The test is 1 Dean.

James Lawrence is the contractor on a wildcat test which Walter A. Roung is undertaking at 1 Arney, in 9-4n-6w, Daviess County, Indiana.

Gale & Walters Drilling Co., Lincoln City, Ind., has a rig running for Grant Mullenax at 1 Stennicker, a wildcat in 20-3s-5w, Dubois County, Indiana. The location is about 2 miles south of where this contractor recently drilled a well for its own account.

Hunter Brothers, Wichita Falls, Tex., have the contract for a 6,500-ft. wildcat test which Stephens Petroleum Co. is starting in Section 7, T&NO Survey, 4½ miles southeast of Henrietta, Clay County, North Texas.

Jackson Drilling Co., Wichita, is starting another test for Westgate-Greenland Oil Co. at the southwest end of the Broadway pool, on the Kingman-Sedgwick County line, western Kansas. Latest operation is 2 Harding, NE SE NE 1-28-5.

Carl B. King Drilling Co., Midland, Tex., is drilling at Humble Oil & Refing Co. 1 Bell, a wildcat test in Section 3, Block C-37, PSL Survey, Terry County, Texas.

Transit Corp., Great Bend, Kans., is drilling Carter Oil Co.'s second test in the Woodbury area, 8 miles southeast of the Davis Ranch pool, southern Wabaunsee County, northeastern Kansas. The test, 2 Woodbury, is two locations north of 1 Woodbury, now temporarily abandoned as a prospective discovery well after testing a small amount of oil from the St. Peter sand at a total depth of 3,289 ft.

Kemp Drilling Co., Dallas, is drilling a 7,500-ft. exploratory test for its own account in the area 2 miles east of Darrington, Wilkinson County, Mississippi. Location of the test, 1 U.S.A., is in 27-4n-1w.

Southeastern Drilling Co., Dallas, has taken on two additional contracts. One is for a deep wildcat test to be drilled for A. M. Keisker and C. J. Norsworthy, Jr., in 10-10n-19w, 5 miles north of the Gwinville field, Simpson County, Mississippi. The other is a 3,500-ft. test for W. T. Trammel and associates in the H. H. Horn Survey, 1¼ miles northeast of Kerens, Navarro County, East Texas.

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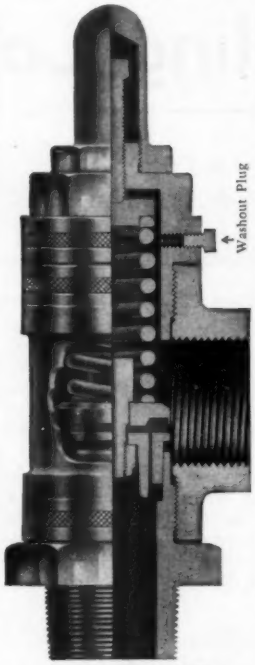

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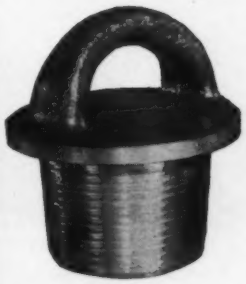

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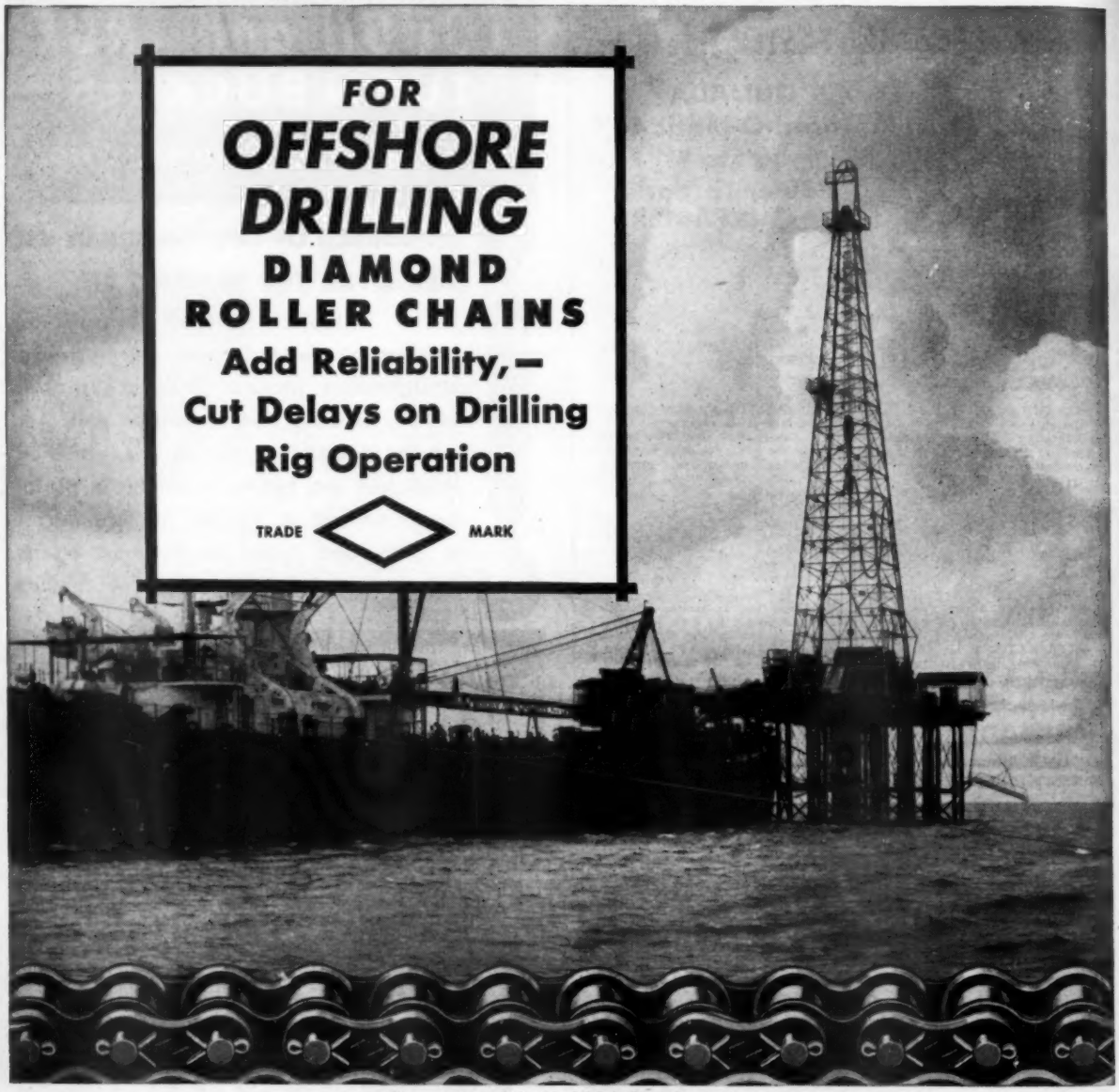

Photo courtesy of Humble Oil & Refining Company

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Northwest Arkansas Test

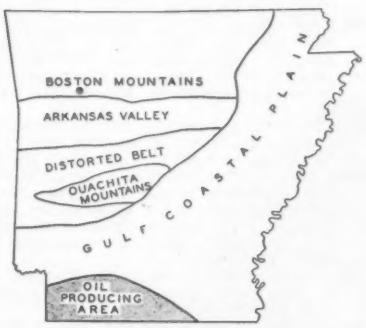
NEAR the southern edge of the Ozark highland in the Boston Mountains of Johnson County, Arkansas, Pure Oil Co. is drilling near 2,100 ft. on a test expected to be carried deep enough to determine the oil-producing potentialities of a regionally high and well-formed structure. The hole, located in 17-11n-24w (see map), was spudded October 19. It is being dug with cable tools. Casing has been set at 254 ft. (16-in.) and at 1,427 ft. (13-in.). The driller's log indicates that there have been shows of dry gas in several sands encountered between 1,400 ft. and present drilling depth.

No commercial oil production has ever been found in northwest Arkansas, but experience has shown that this is no reason to condemn an area. Why the area has not produced oil is not known. Several reasons have been offered, such as relatively high carbon ratios, but they can all be disproven by examples from oil-producing areas.

Pure's test has not excited much interest among other operators who consider northwest Arkansas within their operating territory. However, nearly all of these companies will admit that they may be taking a risk by staying clear of the play since they can't put a finger on why they don't believe that oil will be found in the area.

That portion of Arkansas which lies northwest of the coastal plain and south of the Springfield plateau in the northernmost part of the state can be divided into four areas as shown on the accompanying sketch map. The Ouachita Mountains are also known as the novaculite uplift, is considered the least likely place to look for oil in the region. The distorted belt north of the Ouachitas, known as the Fourche Mountains, is composed of intricately folded and overthrust rocks that have been too highly metamorphosed to be considered potential oil country.

Gas has been produced in the Arkansas Valley since 1902. Most of gas occurs in relatively thin sand beds of Pennsylvanian-Atoka age in reservoirs of anticlinal structure. No oil has been found associated with the gas and the area is not considered favorable for oil except possibly at depths about which little is known.



Somewhere between the distorted belt and the Boston Mountains the pre-Pennsylvanian rocks change from the unfavorable siliceous Ouachita facies to the favorable Ozark facies, composed of rocks like those of the nearest oil-producing areas of northeastern Oklahoma.

Arkansas-Louisiana Gas Co. 1 Barton, 27-9n-28w, about 25 miles southwest of Pure's well, was completed as a Pennsylvanian-Morrow gas well a little over a year ago. This 6,650-ft. test found the rocks from the Pennsylvanian to the Ordovician to resemble the Ozark section. (A thorough report on the samples and cores of this well, prepared by the Tulsa office of the United States Geological Survey, is being published by the Arkansas Geological Survey as Bulletin 18).

Although most geologists don't regard the Boston Mountains as top-notch prospecting country they do agree that there are many reasons why oil in commercial quantities might exist in this area. Here there is an essentially complete section of unmetamorphosed rocks from Upper Cambrian through the Mississippian with numerous unconformities and overlaps. A number of Paleozoic rocks on the Ozark highland give off the odor of petroleum when freshly fractured and structures favorable for oil accumulation are plentiful.

Few stratigraphically deep tests have been drilled in the more favorable areas of northwest Arkansas. Perhaps Pure's test should be rousing more interest than it is.

Philip C. Ingalls.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—Atlantic Refining Co. is in Tensleep at the North Alkali Butte, Wyoming, wildcat, with no shows reported in that formation. California Co. tested gas at its Red Wash, Utah, wildcat. (See field report this week.)

SOUTH LOUISIANA.—A new gas-condensate strike is assured at Bates & Cornell 1 August Leonards, 29-7s-1e, Acadia Parish. The well is cleaning into pits at the estimated rate of 3,000,000-4,000,000 cu. ft. of gas per day plus 200-300 bbl. of condensate. Production is through perforations in the basal Miocene at 9,934-49 ft.

WEST TEXAS.—The Permian Basin's deepest producer, for a time, from the Ellenburger at 13,275-13,300 ft., this week had prospects of good production in the Devonian. Texas Co.'s 1-X State, Northwest Martin County, was acidized through perforations at 12,280-95 ft., kicked off and flowed 324 bbl. of oil in 9 hours, of which 60 bbl. new oil and 264 bbl. load oil. Following that, it flowed 50 bbl. of clean oil with no water in 4¾ hours, through 12/64-in. choke.

EAST TEXAS.—Texas Co. 1 Scarborough, 1½ miles southeast of Sandusky in Grayson County, had some 30 ft. of pay sand in the Oil Creek section and flowed 20 bbl. of oil an hour on drill-stem tests. Location offsets Oil Creek production about 1 mile on both the south and west, and it is also an east offset to A. O. Phillips 1 Reast, an Ellenburger producer but an Oil Creek failure.

Permian Basin

Texas Co. Reworks Devonian Discovery

MIDLAND.—Texas Co. has reentered its 1-X State, Martin County Ellenburger exploration, for further testing in the Devonian. The well was originally drilled to 13,420 ft., 160 ft. into the Ellenburger, and was completed on the pump for 14 bbl. of oil and 308 bbl. of water. Later it was plugged back to 12,320 ft. for completion in the Devonian. Drill-stem test in the Devonian from 12,151-12,322 ft., open 6 hours and 45 minutes, had fluid at the surface in 1 hour and 55 minutes. After cleaning into pits, it flowed 36.5 bbl. of oil in 3 hours, and recovered 2,072 ft. of mud-cut oil and about the same amount of sulfur water.

A test in the Simpson from 13,110-13,331 ft. recovery 4,004 ft. of oil with no water, under flowing pressure ranging from 130-1,280 psi. Final perforations in the Devonian were from 12,280-95 ft. After a mud-acid treatment, the well kicked off and flowed 264 bbl. of load oil and 60 bbl. of new oil in 9 hours. It was then shut in 24 hours, opened and flowed 51 bbl. of 45°-gravity oil in 4 hours and 45 minutes, through 12/64-in. choke.

In southwest Martin County, Gulf Oil Corp. 2-E G. W. Glass "B," was drilling ahead below 8,755 ft. after recovering 220 ft. of slightly gas-cut mud and a light oil show on a drill-stem test in the Spraberry from 8,630-8,730 ft. The tester was open 2 hours.

Sinclair and Magnolia's 1 Davis, Upton County Ellenburger discovery 5 miles southwest of Pegasus field, has been completed for a daily potential of 174 bbl. of 53.6° gravity oil, plus some water, after many weeks of testing. The flow was through 12/64-in. choke from perforations at 13,153-78 ft. Gas-oil ratio was 1,915 cu. ft.

C. W. Murchison 1 Cannon, wildcat 2 miles northwest of Pegasus field, was reported trying for dual completion from the upper Ellenburger and from the Pennsylvanian. Magnolia was reported building roads for a south offset to the new well. The 1 Cannon was drilled to 13,185 ft. and was to be perforated in the Ellenburger from 13,110-63 ft., plus open hole pay from 13,175-185 ft. Pay zone in the Pennsylvanian was to be from 10,465-10,530 ft. The well made flows of oil from both zones.

Stanolind Oil & Gas Co.'s 1 C. W. Burton, Howard County reef discovery in 72-33-2n-T&P, completed for a daily potential of 217.63 bbl. of oil, plus 57 bbl. of water, through 15/64-in. choke from perforations at 8,870-92 ft.

Among the deep-well first reports were: Magnolia Petroleum Co. 1 Tom Peay, northeastern Andrews County wildcat which was scheduled to 14,000 ft. Location is ¾ mile northwest of Florey and 3 miles northeast of Means field.

Wilshire Oil Co. had plans to drill a 12,000-ft. test in southern Terry County about 2 miles southwest of nearest production in new Adair Wolfcamp field. The outpost will be 1 J. L. Sims in 20-C32-PSL.

Texas Co. has scheduled a 13,500-ft. wildcat for Midland County, as the 1-C Ruth & Clarence Scharbauer. Location is 8 miles southwest of Midland, and 1 mile west of Ralph Lowe 1 Hill, which was last reported drilling lime and chert at 12,149 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Crockett County: C. S. Jones 1-F University, 36-30-University Lands, 16 mi. W Ozona, TD 1,135 ft., pay 1,320 ft., pumped 23 bbl. 30°-gravity oil a day.

Midland County: Magnolia Petroleum Co. 1 H. F. Timmerman, 8-40-3S-T&P, 12 mi. SW Midland, TD 13,030 ft., PB 10,490 ft., elev. 2,851 ft., Pennsylvanian 10,150 ft., perf. 10,440-85 ft., flowed 400 bbl. 44°-gfavity oil a day, 28/64-in. choke, GOR 1,770 cu. ft., TP 690-500 psi.

Schleicher County: Frank & George Frankel 1 R. S. Williams, Sec. 26, HE&WT Sur., A-1136, 12 mi. S Mertzon, TD 5,620 ft., elev. 2,316 ft., perf. 5,520-40 ft. in Wolfcamp, flowed 299.7 bbl. 39°-gravity oil a day, ½-in. choke, GOR 797 cu. ft., TP 175 psi.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Borden County: Vickers Petroleum Co. 1 J. R. Canning "B," 142-25-H&TC, ½ mi. N 1-A Canning discovery, dry, TD 8,385 ft., elev. 2,295 ft., reef 7,062 ft., Mississippian 8,095 ft., Ellenburger 8,258 ft.

Coke County: Humble Oil & Refining Co. 1 Strake-Schuch, Tom Deterich Sur. 6, 13 mi. S Robert Lee, dry, TD 6,685 ft., elev. 2,358 ft., Palo Pinto 5,334 ft., Ellenburger 6,598 ft.

Dickens County: C. L. Norsworthy, Jr. 1 Doc Burleson, Blk. WC, J. C. Keller Sur., 14½ mi. E Spur, dry, TD 7,511 ft., elev. 2,027 ft., Pennsylvanian 5,458 ft., Mississippian 6,920 ft., Ellenburger 7,108 ft.

Gaines County: Texas Co. 1 C. B. Carswell, 24-A25-PSL, 4 mi. E Boydell, dry, TD 9,942 ft., elev. 3,395 ft., Devonian 9,920 ft.

King County: Tide Water Associated Oil Co. 1-C Pitchfork Ranch, Sec. 269, John Gibson Sur., 8 mi. NW Guthrie, dry, TD 6,780 ft., elev. 1,992 ft., Clear Fork 1,150 ft., Wolfcamp 3,008 ft., Mississippian 6,620 ft.

McCulloch County: John R. Sterrett 2 N. V. Hodges, 4 mi. N Brady, Sur. 163, dry, TD 629 ft.

Motley County: A. Gutowsky, Inc. 1 Mrs. Mattie Waybourn, Sec. 10, BS&F Sur., 8 mi. N Matador, dry, TD 4,141 ft., elev. 2,320 ft., Wolfcamp 3,880 ft.

Pecos County: Geo. T. Abell 1 Cordova Union, 2-141-T&St.L., 15 mi. SE Imperial, dry, TD 1,430 ft. in water sand.

Runnels County: Lawton Oil Corp. 1-A Lula Fowler, Columbus-Ttp RR Sur. 57, 4 mi. SW Winters, dry, TD 4,423 ft., elev. 1,926 ft., Canyon sand 3,513 ft.

C. L. Norsworthy, Jr. 1 W. J. Curtis, Sec. 356, J. Fairchield Sur., 3½ mi. W Ballinger, dry, TD 4,227 ft., elev. 1,669 ft.

Strahan & Barton 1 W. H. Jacob, J. C. McKean Sur. 534, 5½ mi. SE Winters, dry, TD 4,032 ft., elev. 1,726 ft., Fry sand 3,666 ft., Gardner 3,892 ft., Grayburg 4,019 ft.

Schleicher County: H. L. Hunt 1 D. C. O. Wilson, 17-A520-J. V. Massey Sur., 22½ mi. SE Eldorado, dry, TD 5,515 ft., elev. 2,286 ft., Strawn 4,615 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—DeKalb Agricultural Association 1 J. P. White, Chaves County wildcat in 7-10s-29e, tested 500,000 cu. ft. of gas from perforations at 8,210-35 ft., and the same volume of gas plus 1 bbl. of distillate from perforations at 7,982-8,038 ft. Both sets were squeezed and 200 new holes made from 7,410-60 ft. and 135 shots at 7,205-40 ft.

Spartan Drilling Co. 1 State-25, 25-5s-29e, pre-Cambrian test, was drilling below 8,400 ft. in lime. On elevation of 4,339 ft., top of the Pennsylvanian was 7,050 ft., and a drill-stem test from 7,775-7,806 ft. recovered salt water.

Amerada Petroleum Corp. 2 Caudle, Lea County wildcat in 3-12s-33e, recovered 420 ft. of oil on a 6-hour test from 9,764-9,830 ft. Gas volume was 1,628,000 cu. ft. daily and oil tested 51.7° gravity. Drilling continued below 10,529 ft.

Continental Oil Co.'s 1-B-11 Lockhart, Ellenburger test in the North Drinkard area, flowed at the rate of 76 bbl. of oil an hour on a drill-stem test from 7,590-1,751 ft. Casing was run to 7,750 ft. and testing continued.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCATS

Chaves County: Earl G. Levicks 1 State, 7-8s-27e, 18 mi. NE Roswell, TD 1,990 ft., elev. 4,038 ft., San Andres 1,390 ft., pay 1,960 ft., pumped 5 bbl. 24.5°-gravity oil a day.

Magnolia Petroleum Co. 1-B C. L. O'Brien, 1-9s-28e, 9 mi. SW 1 Lightcap, TD 7,606 ft., PB 7,300 ft., elev. 3,949 ft., Devonian 7,253 ft., perf. 7,253-59 ft., flowed 270 bbl. 54°-gravity oil a day, natural, ¼-in. choke, GOR 1,578 cu. ft., CP 300-800 psi., TP 650 psi.

Lea County: Ralph Lowe 1 Dickenson, 35-14s-37e, TD 12,385 ft., elev. 3,817 ft., Devonian pay 12,250 ft., flowed 960 bbl. 44°-gravity oil a day, 20/64-in. choke, GOR 1,000 cu. ft., TP 850-900 psi.

Michigan

Rayburn Gets One of Year's Big Strikes

MOUNT PLEASANT.—After cleanout following cementing of 5-in. casing, Don Rayburn's 1 Cassidy, S½ SW SE 30-20n-2w, Sherman Township wildcat, Gladwin County, flowed 130 bbl. of oil in 30 minutes to be rated as a new Dundee oil discovery well in the Michigan Basin area, and possibly the most important discovery of the year. After the initial 30-minute flow test, the well was shut in. Operators estimated that the wildcat would flow as much as 300 bbl. of oil an hour. It was to be tubed under pressure, and Rayburn indicated that the flow rate would be restricted voluntarily to 100-120 bbl. a day. The 1 Cassidy was completed in a Dundee dolomite pay at 3,847 ft. after top of Dundee was logged at 3,830 ft. The well was cored from 3,832-47 ft. with 9 of the 15-ft. core being recovered. On drill-stem test with packer set at 3,839 ft. gas showed in 5 minutes and oil flowed to pits in 27 minutes prior to being cased and cleaned out.

This new strike is located about 12 miles northwest of Buckeye Dundee oil pool, structurally lower than other tests in the area by some 5-26 ft. but the 1 Cassidy carried dolomite in the top of the Dundee while the other wells showed dense limestone.

Sun Oil Co. announced a location offsetting the new well, at the 1 Smith, NE NE NW 31-20n-2w, which will be started immediately and Rayburn will start drilling operations on the south offset lease, either in NW NW NE or NE NW NE, 31-20n-2e, soon.

If the 1 Cassidy proves to be the discovery well of a large pool, it will be the third major hit to be credited to Don Rayburn in 10 years. In 1940 he was the co-discoverer of North Adams field, Arenac County. In 1944, Rayburn and Basin Oil Co. drilled the discovery well in prolific Deep River field, Arenac County, the top producing pool in Michigan even now.

MICHIGAN WILDCAT FAILURES

Allegan County: P. K. Degenther 1 Radke, SW SW NW 31-2n-13w, Traverse 1,359 ft., dry, TD 1,400 ft.

Wm. C. Vandenberg, Jr. 1 Evans, SW NE NE 35-4n-16w, Traverse 1,450 ft., dry, TD 1,458 ft.

J. O. Mutch and Fisher-McCall Oil & Gas, Inc. 1 Heiman, NE NE NW 25-3n-16w, Traverse 1,347 ft., dry, TD 1,365 ft.

Arenac County: Ogma Development Co. 1 Bordeau, SE SE SW 20-18n-5e, Dundee 2,714 ft., dry, TD 2,962 ft.

Clare County: W. B. Stewart and Jack Uhl 1 Brand, SW SW NE 1-17n-3w, Dundee 3,913 ft., dry, TD 3,994 ft.

Gladwin County: E. V. Hilliard 1 Ladner et al, NE NW NW 16-20n-1e, dry in sand, TD 5,458 ft.

Isabella County: Leonard Oil, Inc. 1 Tripp, SE SE NE 22-13n-4w, Dundee 3,590 ft., dry, TD 3,619 ft.

Van Buren County: Ford Oil Co. 1 Seleski, SW NW SE 16-1s-16w, Traverse 1,057 ft., dry, TD 1,076 ft.

Kansas

Oil Showings Recorded In Ford County Wildcat

ANOTHER rank wildcat in wide-open southwestern Kansas, where exploration has been intensified within recent months, has encountered promising oil showings. It is Transwestern Oil Corp. 1 Hines, SE SE SW 5-25-22, 3 miles north of Spearville, northern Ford County.

Showings were in the Mississippian, topped at 4,775 ft. (—3,343 ft.). Samples from 4,775 ft. to 4,785 ft. carried good oil staining. A drill-stem test, taking in an interval at 4,750-85 ft. and having tool open 60 minutes, resulted in a recovery of 70 ft. of oil-cut mud. Drilling continues.

The location is 20 miles southeast of the Jetmore pool, Hodgeman County, opened earlier this year by Shell Oil Co., and about 15 miles northeast of the small, shallow Pleasant Valley pool, Ford County, nearest production.

Stafford County appeared to be the most active spot in the state during the week with at least a half dozen prospective discovery wells in various stages of testing and completing. Chief of these was Anschutz Drilling Co. 1 Langer, SE SE SE 4-21-14, in the extreme northwestern part of the county. It was taking potentials following swabbing tests in which it produced up to 25 bbl. of oil per hour. It is about a mile south of the Pritchard pool, across the line in Barton County. Production is from Arbuckle lime, topped at 3,578 ft. (—1,656 ft.). Total depth is 3,582 ft. with casing at 3,579 ft.

About 3 miles to the southeast in the SW SE NE 13, same county, Champlin Refining Co. has completed its 1 McGinty to open the McGinty pool. The well established a potential of 101 bbl. of oil per day, producing from Lansing-Kansas City lime, opposite which casing was perforated at 3,305-13 ft. Hole had been drilled to 3,680 ft. in Arbuckle and plugged back. Location is ¾ mile southwest of the Leo pool and about the same distance northwest of the North Pundsack pool.

Cooperative Refinery Association 1-A Knoche, NE NE NE 6-24-12, in the south central part of the same county, is a prospective gas well from Viola lime, topped at 3,809 ft. (—1,928 ft.). A 15-minute drill-stem test at 3,811-19 ft. showed for an estimated 4,000,000 cu. ft. of gas per day. The breakdown yielded 60 ft. of gas-cut mud. Testing at 3,919-39 ft. with tool open 30 minutes, the well flowed an estimated 250,000 cu. ft. of gas per day and yielded 120 ft. of gas-cut mud with a small oil show.

KANSAS SUCCESSFUL WILDCATS

Barton County: Carlock 1 Klug, SE SE SW 31-16s-12w, elev. 1,952 ft., pumped 34 bbl. oil from Lansing-Kansas City at 3,172-77 ft., TD 3,438 ft., Heebner 3,070 ft.

Saline County: Studnicka et al 1 Richter, SE SE SW 19-15s-3w, elev. 1,283 ft., pumped 132 bbl. oil from cherty Viola at 3,386-91 ft., TD; Mississippi lime 2,846 ft., Hunton 3,296 ft., Maquoketa 3,322 ft.

KANSAS WILDCAT FAILURES

Barton County: Midwestern Drillers 1 Keeler, SW SW NW 35-20s-11w, dry, TD 3,387 ft.

Branine & Holl 1 Brown, SW SW NW 21-19s-12w, elev. 1,894 ft., dry, TD 3,543 ft., Topeka 2,810 ft., Lansing-Kansas City 3,199 ft., Simpson 3,463 ft., Arbuckle 3,491 ft.

Coffey County: Payrock 1 Winzeler, SE SE SE 35-22s-13e, dry, TD 1,859 ft.

Cowley County: Wood River 1 Propp, SW SE SW 26-30s-3e, elev. 1,250 ft., dry, TD 3,433 ft., Kansas City 2,465 ft., Mississippi lime 3,940 ft., Arbuckle 3,407 ft.

Ellis County: Lewis 1 Penney, SE SE SW 31-14s-17w, elev. 1,972 ft., dry, TD 3,664 ft., Topeka 3,003 ft., Lansing-Kansas City 3,271 ft., Arbuckle 3,643 ft.

Ellsworth County: B&R 1 Mattas, NW NW NW 1-15s-10w, elev. 1,612 ft., dry, TD 3,120 ft., Topeka 2,338 ft., Lansing-Kansas City 2,713 ft., Arbuckle 3,078 ft.

Graham County: Jones, Shelburne & Farmer 1 Newell, SE SE SW 2-9s-21w, dry, TD 3,793 ft.

Hodgeman County: Siegel 1 Baldrey, NE NE SW 3-23s-22w, elev. 2,176 ft., dry, TD 4,455 ft., Lansing-Kansas City 3,796 ft., Mississippi lime 4,409 ft.

Kingman County: B&R 1 Clayton, SE SE SE 25-28s-6w, elev. 1,421 ft., dry, TD 4,428 ft., Lansing 3,105 ft., Kansas City 3,272 ft., Mississippi lime 3,940 ft., Viola 4,264 ft., Simpson 4,285 ft., Arbuckle 4,409 ft.

Osborne County: Markham 1 Heitschmidt, SW SW SW 11-9s-14w, elev. 1,940 ft., dry, TD 3,922 ft., Topeka 2,895 ft., Lansing-Kansas City 3,214 ft., Mississippi lime 3,770 ft., Viola 3,788 ft., Simpson 3,892 ft.

Pawnee County: Stanolind 1 Fair, NE SW NE 21-22s-15w, elev. 1,993 ft., dry, TD 4,068 ft., Topeka 3,168 ft., Heebner 3,421 ft., Lansing-Kansas City 3,543 ft., Simpson 3,984 ft., Arbuckle 4,038 ft.

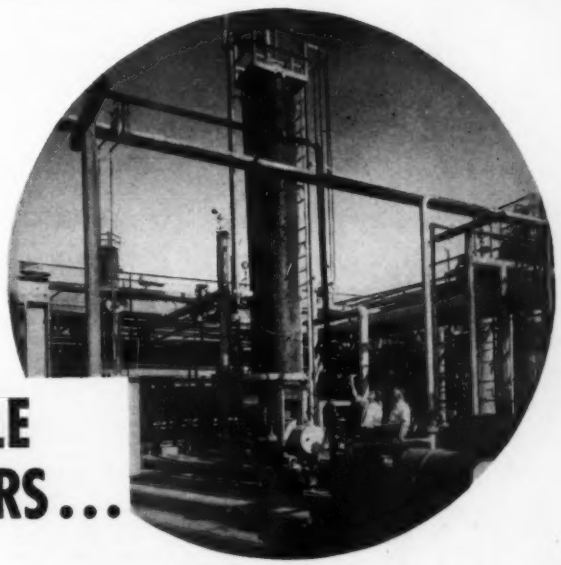
Pottawatomie County: Weller-Busch 1 Brunner, NE NE NE 36-9s-10e, dry, TD 3,000 ft., Lansing 995 ft., Kansas City 1,111 ft., Mississippi lime 1,941 ft., Hunton 2,286 ft., Viola 2,753 ft., Simpson 2,904 ft., no Arbuckle, pre-Cambrian 2,984 ft.

Reno County: Atlantic 1 Love, SE SE SW 33-23s-7w, elev. 1,626 ft., dry, TD 4,197 ft., Heebner 2,916 ft., Lansing-Kansas City 3,116 ft., Mississippi lime 3,713 ft., Viola 4,072 ft., Simpson 4,092 ft., Arbuckle 4,167 ft.

Rice County: Dozier 1 Boy, NW SW SW 16-21s-10w, elev. 1,719 ft., dry, TD 3,447 ft., Topeka 2,587 ft., Lansing-Kansas City 3,033 ft., Simpson 3,377 ft., Arbuckle 3,441 ft.

Scott County: Herndon 1 Shearmire, SE SW SE 19-18s-34w, elev. 3,146 ft., dry, TD 4,850 ft., Mississippi lime 4,755 ft.

Sumner County: Kanotex 1 Hall, NE NW



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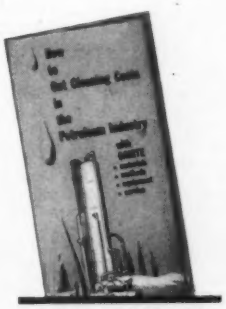

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SW 32-34s-1e, elev. 1,129 ft., dry, TD 3,750 ft., Lansing 3,060 ft., Kansas City 3,255 ft., Mississippi lime 3,723 ft.

Wabaunsee County: Carter 1 Woodbury, SE SW NE 11-15s-10e, elev. 1,415 ft., dry, TD 3,293 ft., Topeka 910 ft., Lansing 1,512 ft., Kansas City 1,676 ft., Mississippi lime 2,564 ft., Hunton 3,030 ft., Viola 3,183 ft., Simpson 3,289 ft.

EASTERN NEBRASKA WILDCAT FAILURE

Richardson County: Aldridge et al., 1 Deckenger, NW NW NE 13-1n-16e, elev. 937 ft., dry, TD 2,560 ft., Mississippi lime 2,000 (?) ft., Hunton 2,485 ft.

Oklahoma

New Wilcox Pool Found In Pottawatomie County

NEWTON BARRETT and Grady Musgrave have prospects of good Wilcox sand production in their 1 Guderian, SE NE NW 12-10n-4e, 3½ miles northeast of Shawnee, Pottawatomie County. A recovery of 3,070 bbl. of clean oil was obtained in a 2-hour drill-stem test of that sand, topped at 4,837 ft. The test was made of an interval at 4,838-59 ft. (total depth). In it, oil rose in the pipe at the rate of 21 bbl. per hour. There was no evidence of water. Previous cores had shown at least 15 ft. of excellent saturated sand. Casing has been cemented on top the sand for production tests. Location is about ¾ mile southeast of the small, Bartlesville sand producing, East Shawnee pool.

Texas Pacific Coal & Oil Co. and Continental Oil Co. 1-A Forges, SW NW SE 23-61-6e, 5 miles northwest of Marietta, in Love County, in the extreme southern part of the state, found good staining and odors in Deese sand, giving indications of another possible new pool on the same northwesterly-southeasterly trending strike on which two pools (East and Northeast Marietta) have been opened recently by Walter Gant and associates. Two drill-stem tests in the section failed to produce any appreciable showing, however, and hole is being cored and drilled ahead. Pennsylvanian was checked on the log at 5,788 ft. Intervals tested were at 5,790-5,812 ft. and 5,861-96 ft. Location is 3 miles northwest of the one-well Greenville pool, opened earlier this year by Sohio Petroleum Co.

Herman Brown 1 Roberts, SW SW NW 15-8n-1e, east offset to the discovery producer and first confirmation well for the recently opened Roulette Creek pool, 15 miles southeast of Norman, in Cleveland County, flowed 283 bbl. of clean oil through ½-in. choke in the first 20 hours after being turned into the tanks. Production is from Wilcox sand, open at 6,456-73 ft.

Initial production tests, made in Arbuckle lime, at Tide Water Associated Oil Co.'s prospective discovery well, 1 Myers, NE NE NW 10-4n-11w, northern Comanche County, in the southwestern part of the state, resulted in a substantial gas flow, carrying a small amount of distillate. Test was made in open hole at 3,520-4,071 ft. following a 2,500-gal. acid treatment. At the end of the first 2 hours of testing, gas flow was at the rate of 3,000,000 cu. ft. per day through 21/64-in. choke. After 12 hours, the flow was at the rate of 1,670,000 cu. ft. of gas per day and 6 gal. of 51.7° distillate per hour. Top of the Arbuckle is 3,440 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Logan County: New pay and extension to Union Valley—Jordan 1 Gates, CE/2 SW SE 29-16n-1w, elev. 1,057 ft., flowed 11,220,000 cu. ft. of gas from Layton at 4,075-95 ft., TD 5,798 ft.

Major County: Extension to Ringwood—North American Car Corp. 1 Kennedy "A," NE NW SW 16-21n-10w, elev. 1,228 ft., flowed 109 bbl. of oil from Manning at 6,880-7,028 ft., TD 7,460 ft.

Stephens County: Extension to Velma—Sinclair 2 Miller, NE SE NE 3-2s-4w, pumped 209 bbl. of oil from Velma at 6,356-6,744 ft., TD 6,773 ft.

OKLAHOMA WILDCAT FAILURES

Jefferson County: Kingery Bros. 1 Woodworth, SW SW NE 2-4s-4w, elev. 939 ft., dry, TD 3,535 ft., Loco 960 ft., Edwards 2,490 ft.

Kay County: Carlock 1 Pittman, SW SW NE 25-27n-4e, elev. 1,032 ft., dry, TD 3,472 ft., Layton lime 2,202 ft., Layton sand 2,295 ft., Checkerboard 2,606 ft., Oswego 2,728 ft., Mississillip lime 3,104 ft., Woodford 3,437 ft., Wilcox 3,464 ft.

Logan County: Carey Trust Co. 1 Gaffney, NW SW SE 7-16n-1e, elev. 1,066 ft., dry, TD 5,542 ft., Hogshooter 3,975 ft., Layton 4,030 ft., Checkerboard 4,070 ft., Big lime 4,628 ft., Oswego 4,674 ft., Prue 4,792 ft., Verdigris 4,827 ft., Bartlesville 4,946 ft., Hunton 5,088 ft., Sylvan 5,193 ft., Viola 5,285 ft., first Wilcox 5,367 ft., second Wilcox 5,524 ft.

McIntosh County: Intex Oil 1-A McKee, SW SW SE 18-10n-18e, dry, TD 2,255 ft., Booch 1,200 ft., Atoka 1,570 ft.

Muskogee County: Gillespie 1 Moore, NW NW SE 1-14n-19e, dry, TD 998 ft., Wilcox 612 ft., Arbuckle 862 ft.

Osage County: Marjo Oil Co. 1 Osage, SW SW SE 24-26n-5e, elev. 977 ft., dry, TD 3,047 ft., upper Layton 1,920 ft., lower Layton 2,060 ft., Checkerboard 2,415 ft., Big lime 2,560 ft., Oswego 2,704 ft., Skinner 2,844 ft., Burbank 2,865 ft., Mississippi chat 3,040 ft.

Pawnee County: Stone et al 1 Ryan, SW SE NW 28-21n-6e, dry, TD 2,800 ft., Big lime-Oswego 2,580 ft., Prue 2,765 ft.

Payne County: Deardorf Oil Corp. 1 Morgan, SW SE SW 1-19n-4e, elev. 988 ft., dry, TD 4,041 ft., Checkerboard 2,863 ft., Oswego 3,130 ft., Prue 3,317 ft., Skinner 3,486 ft., Red Fork 3,524 ft., Mississippi lime 3,796 ft., second Wilcox 4,005 ft.

Pittsburg County: Intex Oil 1 Hughes, NW NW SW 36-7n-18e, dry, TD 3,172 ft., upper Hart coal 2,805 ft., lower Hart coal 2,875 ft., Atoka 3,055 ft.

Southwest Texas

Operator Will Set Pipe At Frio County Prospect

CORPUS CHRISTI.—At its prospective Edwards lime discovery in Frio County, Lone Star Producing Co. has run a drill-stem test at 8,210-31 ft. at 1 Sarah E. Perry. Recovery was 1,080 ft. of oil, 370 ft. of salt water, and 20 ft. of drilling mud. Operators believe that the well has sufficient showings to warrant the running production string. Another 30-minute drill-stem test at 8,234-48 ft., using ¼-in. top and bottom chokes, had a slight blow at beginning of test, increasing steadily to a fair blow at the end. Recovery was 220 ft. of salt water and 30 ft. of drilling mud cut with salt water. According to latest report, operator is reaming core hole and will drill a few feet further and set pipe. The prospective producer is in I&GN Survey, Section 1,699, Abstract 431, 10 miles east and southeast of Pleasanton in Atascosa County.

Milam Drilling Co. is swabbing wash water and 38°-gravity oil from open hole at 1 W. L. Pickens, wildcat test in Austin & Williams Survey 964, Abstract 10, Frio County. A core was taken from 5,612-20 ft. to recover sand. Upper part of the core was hard and tight while the bottom 2 ft. was good oil sand. Operator ran a 40-minute drill-stem test from 5,612-20 ft., using ¼-in. top and bottom chokes. Recovery was 270 ft. of 38°-gravity oil with a bottom-hole flowing pressure of 75 psi.

Another Frio County discovery is indicated at Martin, Shelly, and Thomas 1 Burton Biedeger, C. Lewis Coryen Survey 146, Abstract 264. Coring began at 3,306 ft. and it is reported that approximately 28 ft. of good sand with odor was recovered. Opera-

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tors are running drill-stem test to evaluate shows in the wildcat.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Caldwell County: A. W. Gregg 1 Andy Burton, A. M. Leavey Sur., 3 mi. NE Mendoza, dry, TD 1,535 ft.

Gonzales County: Kirkwood & Co. 2 Webber, Thomas Wright Sur., 4½ mi. SW Smiley, dry, TD 650 ft.

Jim Hogg County: Ben D. Marks Trust 2 Viggo Gruy et al, Sec. 3, Simon de Ynojosa Sur., A-356, dry, TD 4,105 ft.

Jim Wells County: Mabel Richardson Oil Co. and Fred F. Morgan 1 Henry Kuehl, Los Presenos Grant, 3 mi. SE Alice, dry, TD 5,760 ft.

Nueces County: Southern Minerals Corp. 1 Driscoll est., W. M. Gamble Sur., A-118, dry, TD 8,003 ft.

Williamson County: Harold D. Reeves 1 Walter Lohman, Elisha Davis Sur., A-244, dry, TD 3,130 ft.

Mississippi

Two New Wells To Go to Wilcox

JACKSON.—Two new Wilcox tests in Wilkinson County highlight current activity in Mississippi. Kemp Drilling Co. 1 U. S. A., 27-4n-1w, is scheduled to go to 7,500 ft. Location is approximately 2 miles east of Darrington. The other well, scheduled to go to 7,000 ft., is G. A. Clements, Rees R. Oliver, and Barnett Serio 1 Stuart, 5-2n-4w. Rig is now being moved on location and operators are expected to get under way immediately.

R. J. Bartlett and Barnett Serio 1 George W. Armstrong, 37-6n-3w, Adams County, continues to test a high volume of salt water. Following a squeeze job on perforations at 6,325-27 ft., operators perforated in the McKittrick sand. At latest report, the well pumped an estimated 15 bbl. of oil with 90 per cent water during a 15-hour test.

Efforts to extend Carthage Point field of Adams County to the south failed at Southern Production Co. 1 George W. Armstrong, 22-6n-3w. Total depth was 10,341 ft. The company set a string of 5½-in. casing at 7,223 ft. and perforated at 7,154-63 ft. and 6,054-60 ft. in the Wilcox zone. Salt water resulted from both sets of perforations.

In the same county, Dorris Ballew 1 James Fowler, 47-8n-2w, wildcat in Pine Ridge field area, proved disappointing at total depth of 10,165 ft. The venture logged slight oil shows at 10,062-65 ft. and 10,068-72 ft. Two drill-stem tests were attempted on the 10,062-65 ft. interval, with both tests failing.

George Vasen 1 Tung Oil Corp., 9-2s-11w, Stone County wildcat, is now coring below 19,500 ft. Operator is releasing no information on the well, but indicates that he will continue to drill ahead.

In South Carlton field, Alabama, Humble Oil & Refining Co. is nearing the regular pay interval at 4 J. H. Wall est., 11-3n-2e. Drilling is continuing below 5,230 ft.

MISSISSIPPI WILDCAT FAILURE

Adams County: Dorris Ballew 1 James Fowler, 47-8n-2w, dry, TD 10,165 ft.

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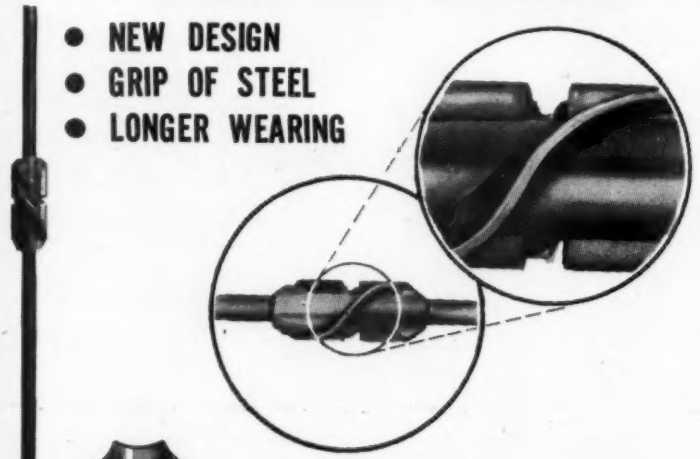

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South Louisiana

Bates & Cornell Open Gas-Condensate Area

NEW ORLEANS.—A new gas-condensate field is assured at Bates & Cornell 1 August Leonards, 29-1s-1e, Aacadia Parish. Through a 10/64-in. choke, the well is cleaning into pits at the estimated rate of 3,000,000-4,000,000 cu. ft. of gas plus 200-300 bbl. of condensate. Flowing pressure on the tubing is 5,450 psi. The new strike is producing through perforations in the basal Miocene at 9,934-49 ft. Total depth is 9,976 ft. and operators set 7-in. casing at 9,816 ft.

Two miles northeast of Bayou Plaquemines field, Iberville Parish, Placid Oil Co. is testing 1 Wilbert's Enterprise, 46-9s-12e, prospective discovery well. Hole is bottomed at 11,548 ft. with 7-in. casing cemented at 11,410 ft. Operators perforated at 11,014-26 ft., but testing was delayed due to packer being stuck in the hole. This was recovered and perforations were squeezed with plastic. At last report, testing operations were under way, but no results were available.

Salt water again broke through after a squeeze job on original perforations at 4,442-44 ft. at Gulf Refining Co. 2 Ben J. Altheimer et al, 24-4n-4e, Avoyelles Parish. After first perforations at this interval, the well yielded 50 bbl. of oil and 115 bbl. of salt water on 26-hour test. After a squeeze and reperforating the same interval, the well flowed 50 bbl. oil during 8 hours through a 10/64-in. choke. However, on a later test, it flowed 70 bbl. of fluid, half oil and half water. Tubing was pulled and another squeeze job is being attempted.

Sun Oil Co. and associates have perforated from 11,425-26 ft., ran a squeeze job, and are waiting on cement to harden before perforating for production test at 1 Zenor, 42-15s-11e, St. Mary Parish wildcat. Hole is bottomed at 13,596 ft. and has 5-in. liner cemented between 7-in. casing set at 12,000 ft. and total depth.

California Co. has stopped at 13,500 ft. its deep wildcat on the Cut Off Prospect in Lafourche Parish. The test, 1 Calco-Danciger, NW NE 56-17s-21e, to log any showings that warranted running of casing for production tests.

SOUTH LOUISIANA WILDCAT FAILURES

Beauregard Parish: James P. Owen 1 Sabine Lumber Co., 10-4s-12w, dry, TD 11,734 ft.

Lafourche Parish: California Co. 1 Calco-

Danciger, 56-17s-21e, dry, TD 13,500 ft.
Terrebonne Parish: Shell Oil Co. 4 Continental Land & Fur Co., 26-17s-14e, dry, TD 11,439 ft.

North Central Texas

Stonewall County Wildcat Flows Oil from Strawn

WICHITA FALLS.—Katz and Venable 1 Dozier, Stonewall County wildcat 8 miles west of O'Brien was reported flowing oil from a Strawn section tested through drill-stem at 4,825-34 ft. Gas showed at the surface in 10 minutes and oil in 1 hour and 55 minutes, at which time the tester was closed. Drill pipe unloaded while coming out of the hole at an estimated rate of 20-25 bbl. of oil an hour. Flowing pressure was 1,125 pis. Top of the Strawn was 4,823 ft., or minus 3,333 ft.

Seaboard Oil Co. 1 Sparks, east offset to its 1 Edwards Canyon reef discovery in southwest Stonewall, was drilling in shale at 4,480 ft.

Sun Oil Co. and Seaboard's 1 Paramore, Pennsylvanian discovery in southwest Nolan County, reported its first 24-hour gage, during which it produced 70 bbl. of oil through 13/64-in. choke, under flowing pressure of 250 psi. Perforations in casing were at 7,011-21 ft.

A good Mississippian discovery has been completed in Archer County by L. T. Burns. The new well is the 1 J. L. Anderson, 4 miles northeast of Megargel, which flowed 148 bbl. of 43°-gravity oil in 8 hours through 15/64-in. choke, from limestone pay at 5,072-5,118 ft. The discovery is a new pay in a shallower sand area.

In Throckmorton County, Cities Service Oil Co. 1-154 Swenson Land & Cattle Co. was testing after perforating in the lower Caddo from 4,973-83 ft. Before running casing to 5,000 ft., a drill-stem test from 4,977-5,000 ft. unloaded 41°-gravity oil while pipe was being pulled, and recovered 720 ft. of oil in the pipe, plus some salt water on bottom.

In Young County, R. C. Lipscomb completed his 1-A Furr and Allar Co. as a Mississippian discovery. On potential test the well flowed 110 bbl. of 42°-gravity oil a day through 7/16-in. choke, from pay at 4,879-92 ft. Location is 3 miles southeast of Padgitt field and 3½ miles northwest of Newcastle.

C. S. Atchison 1-A McClelland, southeast of Lester Caddo field of Jacksboro County, but separated from the area by dry holes, flowed 14,000,000 cu. ft. of gas a day from the Caddo limestone at 4,910-28 ft., plus an estimated 1 bbl. of distillate per 54,000 cu. ft. of gas. The new producer is a west offset to a Caddo oil discovery by the same operator.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Jack County: Star Oil Co., Inc. 1 T. H. Cherryhomes "A," C. J. C. O'Connor Sur., 4 mi. S Cundiff, TD 5,722 ft., Caddo 4,908 ft., conglomerate pay 5,619 ft., flowed 210 bbl. 40°-gravity oil in 12 hr., ½-in. choke, GOR 1,440 cu. ft., CP 400 psi., TP 350 psi.

Montague County: An-Son Petroleum Corp. 1 Foster, S. Smith Sur., 6 mi. NW Bowie, TD 6,138 ft., elev. 1,111 ft., perf. conglomerate 6,079-99 ft., flowed 130.5 bbl. 47.5°-gravity oil in 6 hr., ¼-in. choke, GOR 1,320 cu. ft., TP 825 psi.

Nolan County: Texas Pacific Coal & Oil Co. 1-A May Sears, Acct. 1, 64-20-T&P, 9 mi. E Sweetwater, TD 6,014 ft., elev. 2,034 ft., Ellenburger pay 5,950 ft., pumped 179.7 bbl. 42°-gravity oil a day, GOR 150 cu. ft.

Stephens County: J. F. & H. E. Baker 3 J. E. Glenn, Sec. 2064, TE&L Sur., 8 mi. SE Breckenridge, TD 1,991 ft., perf. sand 1,982-91 ft., pumped 12 bbl. 39°-gravity oil a day.

Wittmer-Knight & Ewing 1 Ila Norvell, Sec. 76, BAL Sur., 9 mi. SW Breckenridge, TD 3,695 ft., Ranger sand 3,663 ft., pay 3,674 ft., flowed 112 bbl. 42°-gravity oil a day, 14/64-in. choke, GOR 1,480 cu. ft., TP 840 psi.

Wise County: Akin & Dimock 1 M. N. Jennings, Wm. Hersee Sur., 1 mi. S Chico, TD 5,721 ft., elev. 964 ft., conglomerate 5,657 ft., pumped 38.9 bbl. 40°-gravity oil a day.

Young County: Chas. J. Kleiner est. et al 70 C. W. Langston "A," TE&L Sur., 5 mi. NW Loving, TD 3,527 ft., elev. 1,190 ft., Strawn sand pay 3,521 ft., flowed 103 bbl. 43°-gravity oil a day, 14/64-in. choke, GOR 200 cu. ft., TP 125 psi.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: L. T. Burns 1 R. Horky, Blk. 37, Meade L. M. Pasture Subd., W. E. Probert Sur., 4½ mi. NE Megargel, dry, TD 5,242 ft., Barnett 5,212 ft.

Henry Grace Production Co. 1 G. D. Prideaux, R. Crossman Sur., 8 mi. SE Anarene, dry, TD 820 ft.

Ted Weiner and Harry Dalton 1 J. D. Sebring, H&TC Sur., 4 mi. SW Dundee, dry, TD 5,454 ft.

Frank Wood 1 Clarence Wolf, Blk. 4, Clark & Plumb Sur., 1½ mi. N Windthorst, dry, TD 4,650 ft.

Callahan County: Kiel & Co. 1 McCoy est., Lge. 337, Blk. 11, Victoria CSL, 6 mi. SW Admiral, dry, TD 1,118 ft.

Clay County: M. W. Blair 1 B. H. Van Winkle, Blk. 62, Parker CSL, 4½ mi. SE Petrolia, dry, TD 1,825 ft.

T. B. Cochran 1 Ambrose Douthitt, Z & H Whitesides Sur., 6 mi. SE Petrolia, dry, TD 1,838 ft.

Coleman County: Viking Oil Corp. 1 J. C. Day, D. H. Minor Sur., 2 mi. N Gouldbusk, dry, TD 2,512 ft., elev. 1,568 ft., Caddo 2,140 ft., Marble Falls 2,385 ft.

Cooke County: Timberlake & Scott Bros. 1 Edna Fielder, Elanor Langford Sur., 5½ mi. SW Muenster, dry, TD 3,012 ft., elev. 1,035 ft., conglomerate 2,914 ft., pre-Cambrian 3,008 ft.

Fisher County: Woodley Petroleum Co. 1 L. M. Green "A," 179-2-H&TC, 5 mi. NE Rotan, dry, TD 5,667 ft., elev. 1,855 ft., Canyon sand 4,939 ft., Palo Pinto 5,500 ft.

Haskell County: Anderson Prichard Oil Co. 1-A Russell, Sec. 19, Jane Wilson Sur., 4 mi. SW Weinert, dry, TD 5,250 ft., elev. 1,550 ft., Bunger 3,035 ft., Strawn lime 4,498 ft.

Jones County: J. W. Baldwin 1 J. M. Alexander, Blk. 2, E. C. Miller Sur., 5 mi. SW Leuders, dry, TD 2,106 ft.

B. M. Hester & Son 1 D. W. Gray, G. Martinez Sur. 207, 8 mi. SW Anson, dry, TD 3,510 ft., elev. 1,721 ft., Flippen 2,537 ft.

Sojourner Drilling Co. 1 T. J. Pope, 16-2-SPRR, 3½ mi. S Anson, dry, TD 4,583 ft., elev. 1,797 ft., Flippen 2,420 ft., Swastika 2,815 ft., Strawn 4,450 ft.

Warren Oil Corp. 1 W. C. Matchett, Blk. 354, Austin & Williams Sur., 1 mi. S Hamlin, dry, TD 5,525 ft., elev. 1,743 ft., Flippen 3,026 ft., Cook 3,086 ft., Strawn 5,490 ft.

Montague County: Blackwood & Nichols Co. 1 Lion Volkman, John McAdams, Jr. Sur., A-456, 5 mi. SE Forestburg, dry, TD 7,218 ft., conglomerate 6,624-38 ft. had show of gas.

Russell Maguire 1 B. C. Rich, W. S. Harkin Sur., 3½ mi. NW Belcherville, dry, TD 5,942 ft., Caddo 5,714 ft., Ellenburger 5,835 ft.

Palo Pinto County: A. J. White and H. B. Kendall 1 M. Zimicki, 43-2-T&P, 9 mi. SW Palo Pinto, dry, TD 1,364 ft., sand with oil odor 1,288-98 ft.

Stonewall County: F. Kirk Johnson 1 A. E. Smith, 143-1-H&TC, 7 mi. SE Aspermont, dry, TD 6,104 ft., elev. 1,763 ft., Mississippian 6,037 ft.

J. T. O'Neal-Arriba Oil Corp. 1 Arthur Brinkley, Jr., 6-A-Arnold & Barrett Sur., 3½ mi. S SW Old Glory, dry, TD 6,530 ft., elev. 1,694 ft., Swastika 3,462 ft., conglomerate 6,192 ft., Mississippian 6,322 ft., Ellenburger 6,395 ft.

Taylor County: Norsworthy & Tompkins 1

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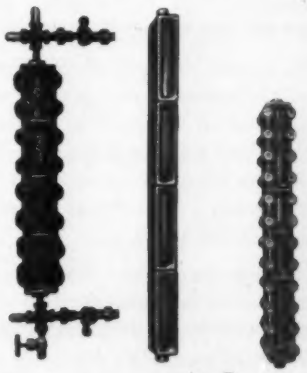
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J. W. Hammond, Blk. 5, J. McSherry Sur., 3 mi. SW Tye, dry, TD 3,254 ft., elev. 1,854 ft., Dothan 2,015 ft., Tannehill sand 2,338 ft., Flippen 2,425 ft., base Cisco 2,740 ft.

Throckmorton County: L. A. Warren Drilling Co. 1 J. G. Parker, Sec. 936, TE&L Sur., 1 mi. W Woodson, dry, TD 502 ft.

Woodley Petroleum Co. 1 J. Rex Raiza, Sarah Blythe Sur., 1 mi. S Lusk, dry, TD 4,705 ft., elev. 1,217 ft.

Texas Gulf Coast

New Luling Sand Strike Waits on Potential Gage

HOUSTON.—Frank W. Michaux has completed 1 Kaufmann estate for a new oil discovery in Goliad County, 2 miles south of Charco. Through 144 jet perforations at 7,675-7,710 ft. in the Luling sand, the well flowed gas-condensate with a flowing tubing pressure of 1,750 psi. and shut-in tubing pressure of 2,875 psi. Further tests are awaiting potential gage. After operator was assured of a commercial producer in the Luling, cores and a drill-stem test were taken of the Mackhank sand horizon with no commercial recovery. The Massive was also drill-stem tested and proved disappointing. The new strike is located in the George Southerland Survey, Abstract 267. Operator has skidded rig 1,600 ft. to the north for a confirmation test.

Arnold O. Morgan has set production string and is waiting on cement at his 1 Ed Fricke, Esteban Lopez Survey, Refugio County, confirmation test to the discovery of new Boehm field. The pool opener, Morgan 1 Boehm, is located 5 miles southeast of Woodsboro. Total depth of the confirmation well is 5,330 ft., where Morgan ran electrical survey, took sidewall cores, and ran casing.

A new Wharton County gas discovery has been completed at Kingwood Oil Co. 2 Lacy W. Armour et al, Charles Howard League, Abstract 181. Through perforations at 5,201-08 ft. and 5,215-20 ft., the well flowed an estimated 10,000,000 cu. ft. of gas per day with 2,150 psi. tubing pressure. Hole is bottomed at 6,839 ft. with 5½-in. casing set at 5,200 ft.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Lavaca County: Horrigan & Fohs 1 Rosie Martisak et al, John Morris Sur., A-303, TD 9,906 ft., perf. 9,696-736 ft., Wilcox pay 6,300 ft., 74 bbl. condensate per day plus 675,000 cu. ft. of gas.

Victoria County: Quintana Petroleum Corp. 1-B Henderson & Pickering, A. B. Williams Sur., A-353, TD 7,020 ft., perf. 6,852-55 ft., 125 bbl. oil per day, 9/64-in. choke, 48.3° gravity.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Newman Bros. Drilling Co., Alaska Steamship Corp., and Calvert Corp. 1 G. L. Limerick, R. Bindewald Sur., A-344, dry, TD 5,200 ft.

Brazoria County: C. H. Alexander 1 Hearne-Schilab et al, Hooper and Wade Sur., A-420, ¼ mi. N Alvin, dry, TD 10,250 ft.

Chambers County: Standard Oil Co. of Texas 1 G. R. Canada, John Johnson Sur., A-161, 10 mi. S Anahuac, dry, TD 9,723 ft.

Fort Bend County: Ballard Pistulka Enterprises 1 G. W. Trone est., H&TC RR Co. Sur. 67, dry, TD 1,718 ft.

Goliad County: Houston Oil Co. 2 Bertha Wilkinson et al, Joseph Callahan Sur., 3 mi. N NW Berclair, dry, TD 2,165 ft.

Jackson County: John B. Coffee 1 Kountze & Stewart, Morris and Cummings Sur., A-284, dry, TD 7,231 ft.

Liberty County: Lamar Hunt Trust est. 1 Martin Zalesky, E. P. Miller Sur., A-734, 3 mi. N Eastgate, dry, TD 7,172 ft.

Live Oak County: Louis H. Harding, Jr., Edwin L. Cox, and G. R. Boyd 1 H. D. Miller, M. Hunt Sur., A-236, dry, TD 4,934 ft.

H. A. & M. B. Johnson 1 L. S. Adams, C. F. Simmons Subd., E. Arnold Sur., dry, TD 1,530 ft.

Newton County: Houston Oil Co.-Gulf Oil Corp. F-1 Earl C. Hankamer et al, HT&B Sur., Sec. 2, A-930, dry, TD 7,515 ft.

Orange County: Rasnick & Brown 1 Babette Moore Odom, I&GN Sec. 16, A-230, 3 mi. W Mauriceville, dry, TD 8,510 ft.

Refugio County: Kirkwood & Morgan, Inc. 1 W. & E. Damman, Johnson & Pugh Subd. of Bonnie View Ranch, 3 mi. SE LaRosa field, dry, TD 6,750 ft.

Ohio Fields

New Castle Township Continues Active

COLUMBUS.—New Castle Township, Coshocton County, oil pool is still providing the best wells being drilled at this time. Pure Oil Co. 3 Perry Richards, third Quarter, found the first Clinton dry at 3.196-15 ft., but the second Clinton productive to the extent of swabbing 80 bbl. in 24 hours after shot. The producing sand was logged at 3,225-29 ft. Preston Oil Co. 2 C. I. Williams, Section 18, same township, made 30 bbl. after shot.

Berea sand in Perry Township, Ashland County, produced a well of 80 bbl. after shot. The well, drilled by Wayne Shorts, was 6 Mabel Woolridge.

Ohio Fuel Gas Co. 1 M. P. Kline, Section 30, Knox Township, Holmes County, found the Newburg sand at 2,438-38 ft. with a volume of 759,000 cu. ft. of gas.

Mid East Oil Co. 2 Walter Ridenhour, Section 33, Hopewell Township, Perry County, logged Clinton sand at 2,938-30 ft., with a volume of 1,554,000 cu. ft. of gas.

Canadian Fields

Thick Dual-Zone Pay In Duhamel Prospect

CALGARY.—Socony-Vacuum Exploration Co. has found D3 Devonian reef at its Socony-Duhamel 29-14 well, with a large oil potential and thick productive section indicated. The test, located 2 miles due north of Socony-Flint D2-D3 discovery, recently established a thick oil and gas pay zone in D2 horizon. In prospect for Duhamel is the greatest thickness of dual-zone Devonian pay so far tapped on the Alberta Plains. The well is in LSD 14, 29-45-21w4, about 13 miles southwest of Camrose, central Alberta.

Meanwhile, in the Rowley and Delia areas 70 miles northeast of Calgary, the same company has recorded natural gas discoveries in drill-stem tests at two current wildcats. Both are heading on for test of deeper formations.

Duhamel 29-14 logged top of D3 zone at 4,698 ft., 109 ft. higher in elevation than at Socony Flint 1. First test was run of interval 4,690-4,705 ft., and result was a natural gas flow of 5,200,000 cu. ft. daily, with no fluid recovery in pipe. The next test gave oil, to indicate only about 7 ft. of "gas cap." Test at 4,705-42 ft. brought a flow of crude oil to the surface in 7 minutes. The well was produced through drill stem for 4 hours, and indicated a daily rate of 1,270 bbl. Gas-oil ratio was low.

In D2 zone, which was topped at 4,417 ft., the Duhamel venture found 66 ft. of zone highly productive of natural gas plus some oil, and 55 ft. of zone giving an estimated 2,000 bbl. daily potential of 34°-gravity oil. No water showed down to base of the 121-ft. D2 zone, which was topped 85 ft. higher than the Flint discovery, and picked up an additional elevation to log 109 ft. higher than the Flint. Socony-Flint 1 had about 35 ft. of D2 oil column above water line, and 23 ft. of D3 zone oil pay above water. It completed as a D3 producer, with D2 cased off. Duhamel has also cased off D2, and will probably complete as a D3 producer.

About 80 miles south of its highly promising Duhamel operation, Socony-Vacuum has encouragement at two wildcats. Socony-Delia 2, in LSD 3, 20-18w4, has found natural gas in the Viking sand section in larger volume than at previous ventures in the general area. Socony-Grewer-Rowley 1, in LSD 14, 15-32-20w4, joint Socony-Theo. A. Grewer test, has found some natural gas in the Madison limestone. Both are scheduled as Devonian tests.

The Delia well tested the interval at 3,750-3,766 ft., and obtained gas flow rated at 750,000 cu. ft. daily. A further Viking sand section showed up from 3,815-69 ft., with gas indicated, and drill-stem test is now under way.

The Rowley well tested the Madison lime-

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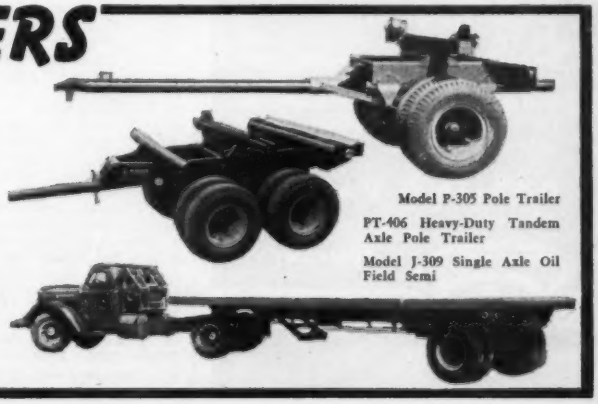

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stone at 4,335-51 ft. and obtained a gas flow rate of 500,000 cu. ft. daily, plus 75 ft. of gassy drilling mud. The well is now drilling deep in the Madison section below 4,471 ft.

First production returns from Naco-Drumheller 2, Basal Cretaceous discovery, indicate an initial potential of about 195 bbl. of 32.1°-gravity oil daily on restricted flow. The well, in LSD 14, 36-29-20w4, is located in southern Alberta about 7 miles northeast of Drumheller and 65 miles northeast of Calgary. It found 39 ft. of Basal Cretaceous oil pay at 4,425-4,464 ft. Hole was carried down to 4,566 ft. for test of the Madison limestone, but was plugged back after failing in that horizon. String of 7-in. production casing was set at 4,425 ft.

CANADIAN SUCCESSFUL WILDCATS

Acheson-North 1, LSD 10, 34-53-26w4, TD 5,100 ft.

Gulf-D. O'Shea 6, LSD 6, 10-40-20w4, TD 6,055 ft.

McCarty & Coleman-Waterglen 1, LSD 1, 28-22w4, TD 5,350 ft.

Canadian Superior-Kozak 1, LSD 16, 3-57-17w4 TD 3,330 ft.

Canadian Fina-et al-Bulwark Province 2, LSD, 20-38-12w4, TD 3,004 ft.

CANADIAN SUCCESSFUL WILDCAT

Naco-Drumheller 2, LSD 14, 36-29-20w4, TD 4,566 ft., 195 bbl. oil per day, restricted, from Basal Cretaceous.

Rocky Mountain

Usually Productive Zone Fails in Fremont Test

DENVER.—Atlantic Refining Co. is now in the Tensleep at an important wildcat in the North Alkali area, Fremont County, Wyoming, and tests in the top of the formation have shown only mud. The well is 1 Tribal, CS½ SE SE 29-1s-6e. Tensleep was topped at 9,480 ft. On drill-stem test at 9,489-9,529 ft. there was a weak blow, and the well made 125 ft. of mud in 1 hour. The operator will probably drill through the Tensleep, and possibly to the Madison. This well is of interest because of its location: north of Sand Draw field and northeast of Beaver Creek and Riverton fields, each of which produce oil from the Tensleep. Atlantic drilled the Riverton discovery 2 years ago and now has two wells producing in the field.

It is reported in Vernal, Utah, that California Co. recovered additional gas, with no water, on its fourth test in the upper Green River zone. The well is 1 Unit, NE NE NE 26-7s-23e, and California has not released data on the operation. However, it is reported that the Green River was found around 2,900 ft., and on drill-stem test between 4,261-95 ft. there was gas at the surface in 30 seconds with a gage of 4,335,000 cu. ft. on the 1½-hour test. Bottom-hole flowing pressure was 1,250 psi. on the test. Two hundred feet of fresh water, with no show of oil, was recovered. In the subsequent test it is reported that the well made approximately 8,000,000 cu. ft. of gas daily. Location is southeast of the Roosevelt-Gusher area, where oil is produced from the basal Green River zone. At Roosevelt, Carter Oil Co.-Stanolind Oil & Gas Co. have two wells producing from the basal Green River around 9,200 ft., and California Co. has one small producer on the Gusher unit. This week California is making location for its second Gusher well, 2 miles northwest of the discovery and 3 miles southeast of the Roosevelt wells. Carter and Stanolind are now drilling below 11,026 ft. in sands and shales of basal Green River at 1 Unit, C SW NE 6-1s-2w, at Blue Bell, a wildcat west of Roosevelt in Duchesne County. Tests throughout the Green River zone have shown both gas and oil, but possibly not in sufficient volume to be commercial. Carter is also drilling a basal Green River wildcat at 1 Burnett, C SW SW 34-4s-11w, at Strawberry, on the west side of the Uinta Basin, and this well is now below 6,800 ft.

American Liberty Oil Co. has stopped at 1 Stanolind-Government, SW SW SW 34-57n-80w, in the Northwest Arvada area, Sheridan County, Wyoming, with the well at 9,762 ft., total depth. The well tested through the Dakota with no commercial shows, Sussex sand was found at 5,950 ft. with a stray sand at 9,396 ft. showing some gas. The well was located on a large block held by Stanolind and Union Oil Co. of California and these operators did extensive seismic work through the area prior to making the location. It is one of the few wells to be drilled through the center of the large Powder River Basin. On the east side of the basin, A. B. Cobb is drilling ahead at 1 Unit, C SE SE 5-40n-68w, in the Dull Center area. The operator last week planned to abandon at 6,667 ft. in the Morrison, but has decided to test the Sundance. The well is located on a block farmed out from Superior Oil Co.

COLORADO SUCCESSFUL WILDCAT

Logan County: British-American Oil Producing Co. 1 Koenig-Ashby, NE NE NW 3-8n-54w, TD 5,250 ft., 7-in. casing 5,245 ft., flowed 225 bbl. oil per day, Carlile 4,700 ft., Greenhorn 4,890 ft., "D" sand 5,136 ft., "J" sand 5,240 ft.

COLORADO WILDCAT FAILURES

Logan County: McElroy-Clark 1 Swanson, NW NW SW 21-7n-55w, TD 5,720 ft., dry, Niobrara 5,671 ft., Ft. Hays 4,975 ft., Greenhorn 5,180 ft., "D" sand 5,470 ft., "J" sand 5,570 ft.

Morgan County: Adams Drilling Co. et al 1 Billings, C SE SE 27-3n-57w, TD 5,472 ft., dry, Hygiene 2,385 ft., Niobrara 4,694 ft., Timpas 4,989 ft., Muddy 5,434 ft.

WYOMING SUCCESSFUL WILDCAT

Fremont County: British-American Oil Producing Co. 1 Govt., C NW NE 5-31n-94w, TD 6,306 ft., flowed 6,470,000 cu. ft. gas per day, Frontier 1,225 ft., Mowry, 1,941 ft., Muddy 2,500 ft., Cloverly 2,662 ft., Lakota 2,728 ft., Morrison 2,805 ft., Sundance 3,000 ft., Gypsum Springs 3,356 ft., Nugget 3,400 ft., Chugwater 3,754 ft., Alcova 4,235 ft., Dinwoody 5,146 ft., Phosphoria 5,198 ft., Tensleep 5,648 ft., Amsden 6,150 ft., Darwin 6,220 ft., Madison 6,234 ft.

WYOMING WILDCAT FAILURES

Natrona County: Tide Water Associated Oil Co. 8-3-G, SW SW SW 3-30n-8ew, TD 2,162 ft., dry, Muddy 168 ft., Dakota 285 ft., Fuson 306 ft., Lakota 352 ft., Morrison 428 ft., Sundance 605 ft., Alcova 1,060 ft., Chugwater 1,095 ft., Embar 1,743 ft., Tensleep 2,045 ft.

G. Park Dunford 1 Govt., SE SW NE 9-32n-81w, TD 2,065 ft., dry, Muddy 970 ft., Cloverly 1,135 ft., Morrison 1,280 ft., Sundance 1,433 ft., Nugget 1,802 ft., Alcova 1,923 ft., Chugawter 1,955 ft.

Norris Oil Co. 8-8-25, SE SE SE 25-40n-81w, TD 1,463 ft., dry, second Wall Creek (?) 324 ft., Mowry 878 ft., Muddy 1,155 ft., Dakota 1,317 ft., Lakota 1,397 ft.

Teton County: George G. Travis 1-A Unit, N½ SE SW 5-43n-114w, TD 879 ft., dry.

MONTANA SUCCESSFUL WILDCAT

Rosebud County: Texas Co. 1 State "B," C SE NW 36-11n-33e, TD 5,475 ft., pumped 17 bbl. oil day, first Cat Creek 3,223 ft., Kootenai 3,317 ft., third Cat Creek 3,520 ft., Morrison 3,610 ft., Ellis 3,790 ft., Amsden 4,298 ft., Heath 4,620 ft., Otter 4,965 ft., Kibbey 5,324 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Banner County: Stanolind Oil & Gas Co. 1 Lovercheck State, C NW NE 16-18n-55w, TD 6,659 ft., dry, Pierre 1,254 ft., Niobrara 5,203 ft., Ft. Hays 5,475 ft., Carlile 5,573 ft., Codell 5,573 ft., Green River 5,727 ft., Graneros 5,780 ft., upper Muddy sand 6,071 ft., lower Muddy shale 6,106 ft., Muddy 6,205 ft., Skull Creek 6,234 ft., Dakota 6,417 ft., Lance 6,659 ft.

Daws County: Ryan Oil Co. 1 Robbins, SE

SE NW 8-30n-47w, TD 2,457 ft., dry, Cretaceous 1,425 ft., Greenhorn 1,440 ft., Dakota 1,733 ft., Fuson 2,018 ft., Lakota 2,216 ft.

Appalachian Field

Leidy Township Gas Area Gets Two Good Wells

PITTSBURGH.—In north central Pennsylvania, Leidy Township, Clinton County, Godfrey L. Cabot, Inc. 1 Orlin Repetto, elevation 1,134 ft., was brought in for 27,140,000 cu. ft. of gas. Rock pressure was 3,540 psi. in 40 hours. Tops reported were: Onondaga lime 5,824 ft., Oriskany sand 5,842 ft., gas 5,843 ft., total depth 5,843 ft. New York State Natural Gas Corp. N-191 H. V. Proctor, elevation 1,123 ft., gaged 12,000,000 cu. ft. of gas, rock pressure 3,550 psi. in 24 hours. Onondaga lime was topped at 5,878 ft., Oriskany sand at 5,899 ft., gas at 5,900 ft., total depth 5,900 ft. These wells are on the Hammersley Fork Quadrangle. A location has been made by C. E. Fralich et al 2 U. S. Lumber Co., in the same township, on the Tamarack Quadrangle.

West Virginia.—In Union district, Jackson County, West Virginia, United Fuel Gas Co. 2-6600 D. H. Click resulted in 3,110,000 cu. ft. of gas from brown shale. Total depth was 3,697 ft. In Adkin district, McDowell County, Godfrey L. Cabot, Inc. 37-S-1321 Pocahontas Land Corp. gaged 1,917,000 cu. ft. of gas, after shot in the Berea sand. Total depth was 4,648 ft. In Kermit district, Mingo County, United Fuel Gas Co. 21-6568 Central Trust Co. gaged 1,715,000 cu. ft. of gas from shale. Total depth was 2,626 ft.

California

Mountain View Field Gets New Shallower Horizon

LOS ANGELES.—The old Mountain View field southeast of Bakersfield in San Joaquin Valley has been given a new shallow oil pool. The new pool opener was L. O. Tarrant 1 Zuver in Section 18-30s-29e, about ½ mile northeast of production in the northern portion of the field. Sand trouble has interferred with its completion but the well has shown it will make about a 150-bbl. pumper in the Jeppi sand topped at 4,153 ft. Drilled to a total depth of 4,456 ft. and plugged to 4,226 ft., 26°-gravity crude was obtained through perforations at 4,144-4,218 ft. Top of the Santa Margarita was called at 4,371 ft. Top of the Chanac, Mountain View's other main sand, was not announced.

The new discovery some 6 miles east of Bakersfield, at Edison Groves, received a ½-mile southeast extension test. The stepout will be Trico Oil & Gas Co. et al 1 Raub Community in Section 33-29s-29e. Richfield Oil Corp. 1 Shields-Arms, the pool opener in Section 32, was completed earlier this month for a 350-bbl. well in the Olcese sand at about 3,500 ft.

Drilling on two deep wildcats has been suspended, both of the tests being General Petroleum Corp. operations. At Huron in Fresno County, drilling was halted at 44-14 Boston Land Co. after reaching 14,724 ft. At about 13,200 ft. the wildcat, which is located in Section 14-20s-18e, had swabbed and flowed small quantities of 28°-gravity crude but not sufficient to establish commercial production. The second well was General Petroleum 1 McNally in the La Mirada area of Los Angeles County. Located in Section 22-3s-11w, it was carried to 11,606 ft. The same company also quit at its 3-11 Williamson at 1,634 ft. This shallow test was in the Lost Hills area of Kern County.

CALIFORNIA WILDCAT FAILURES

Fresno County: General Petroleum Corp. 44-14 B.L.C., 14-20s-18e, dry, TD 14,724 ft., elev. 279 ft.

Kern County: Standard Oil Co. 62-32 "3," 32-11n-18w, dry, TD 1,549 ft.

Ohio Oil Co. 1 E. C. Cozart, 31-25s-25e, dry, Mya sand 2,473 ft., TD 3,270 ft., elev. 292 ft.

Los Angeles County: General Petroleum Corp. 1 McNally, 22-3s-11w, dry, TD 11,606 ft., elev. 123 ft.

D. J. R. Oil Co. 1 Wright-Kovaleski, 17-5n-14w, dry, TD 2,418 ft., elev. 2,380 ft.

San Luis Obispo County: Warren L. Meeker & Assoc. 1 H. C. Smith, 15-11n-26w, dry in Pliocene, TD 2,730 ft., elev. 2,700 ft.

C. W. Golgrove 17-16 Jack, 16-25s-16e, dry, TD 1,890 ft., elev. 1,335 ft.

Ventura County: Bolsa Oil Corp. 3 Hidden, 5-4n-18w, dry, TD 3,894 ft., elev. 2,437 ft.

Eastern Texas

Sandusky Field Gets Southeast Extension

DALLAS.—Texas Co. has been assured of an extension well southeast of Sandusky Oil Creek sand field of Grayson County at its 1 M. A. Scarborough. Successful drill-stem tests had been made from 7,153-67 ft. and 7,166-84 ft., and operators were coming out of the hole following a test from 7,184-94 ft. The last test had gas at the surface in 5 minutes.

The first test had gas in 4 minutes, flowed

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THE OIL AND GAS JOURNAL

"Okay, act dumb and ask what in the world this black slick stuff is and they'll give us money to tell where we found it!"

oil and mud in 25 minutes and was open 45 minutes. It made an estimated rate of 20 bbl. of oil hourly and recovered 1,680 ft. of free, 41°-gravity oil. A core to 7,177 ft. recovered additional oil sand and the second test was run. Gas showed in 3 minutes, mud in 9 minutes and clean oil in 12 minutes. The tester was open 15 minutes, which yielded a final recovery of 2,700 ft. of free oil. Flowing pressure was 2,700 psi. Top of the pay sand had not been determined, but was estimated to be around 7,163 ft., which showed oil possibilities on the log.

Stanolind Oil & Gas Co. 1 G. H. Sanders, 1-mile north extension to Woodlawn field of Harrison County, was being acidized for further tests after making a flow of gas gaged at 6,380,000 cu. ft. daily. The flow was through ⅜-in. choke, accompanied by an estimated 127 bbl. of distillate per 1,000,000 cu. ft. Production was from perforations at 6,378-6,410 ft.

A shallow wildcat was reported drilling in Johnson County, 2½ miles northwest of Grandview. The well is W. H. Spradling, Wichita Falls, 1 G. H. Hall. Proposed depth is around 2,100 ft.

Delta Drilling Co. completed its 1 S. M. Taylor, Hopkins County wildcat, as a 2-mile extension to Southeast Pickton field. Completion potential was 299 bbl. of 49°-gravity oil a day, flowing through ¼-in. choke, with gas-oil ratio of 1,650 cu. ft. and tubing pressure of 1,100 psi. Perforations were from 7,884-97 ft.

EAST TEXAS (DISTRICTS 5, 6 AND 6-P) WILDCAT FAILURES

Houston County: R. S. Lytle and M. T. Halbouty 1 King Mitchell, Ramon DeLa Garza Sur., 12 mi. NW Crockett, dry, TD 6,825 ft., upper Woodbine sand 6,550-84 ft. had oil saturation.

Woodley Petroleum Co. 1 Seven J. Stock Farm, John Durst Sur., 20 mi. SW Crockett, dry, TD 8,076 ft.

Smith County: Geier-Jackson, Inc. 1 Mrs. Sallie Rale, I. Renfro Sur., 9 mi. E Tyler, dry, TD 4,466 ft.

Titus County: Ralph Spence 1 R. S. Justiss, James W. Green Sur., 8½ mi. N Mt. Pleasant, dry, TD 5,350 ft.

Wood County: Hassie Hunt and C. S. Gainer 1 F. E. Shamberger, Wm. H. Patton Sur., 2½ mi. S Hainesville, dry, TD 6,381 ft. in salt.

Illinois-Ind.-Ky.

Three New Pools Found In Illinois Basin Area

THREE additional wildcats in the Illinois Basin area have given indications of opening new pools.

Miami Operating Co. 1 Kurtz, SE SE NE 21-3n-10e, 3 miles south of Olney, Richland County, Illinois, flowed clean oil in a drill-stem test of McClosky lime, and has run casing for completion. Total depth is 3,283 ft. with saturation logged at 3,164-69 ft. Casing was cemented at 3,240 ft. In the test, with tool open 50 minutes, gas was at the surface within 15 minutes and oil within 40 minutes. There was no evidence of water. Location is more than a mile from any other production. It is 2 miles northeast of the North Calhoun pool.

Six miles northwest of Carlyle, in Clinton County, same state, Gulf Refining Co. also got a good oil flow in a drill-stem test of McClosky lime at 1,194-1,211 ft. Oil was at the top within 30 minutes after the tool was open. Gas flowed within a minute after the test began. Nearest McClosky production is in the Salem pool, 25 miles to the east. The Frogtown pool, 1½ miles to the southwest, and the Carlyle pool, 3½ miles to the east, nearest other production, produce from the Cypress sand. The McClosky zone in this well has been passed up for the time being, and, at latest report, hole was drilling ahead below 1,700 ft. Salem lime was reported topped around 1,307 ft.

In Wayne County, Illinois, Floyd & Henson and Aurora Gasoline Co. have prospects of good production in both the O'Hara and McClosky at their 1-A Bunting, SW NW NW 35-1s-7e. O'Hara saturation was logged at 3,196-3,208 ft. and McClosky at 3,270-75 ft. Total depth is 3,276 ft. and casing has been run to 3,265 ft., leaving hole open in the McClosky. A 60-minute drill-stem test of the O'Hara zone got gas within 16 minutes and yielded 1,000 ft. of clean oil in the breakdown. The McClosky test, also lasting 60 minutes, flowed gas within 9 minutes and yielded 300 ft. of clean oil and 556 ft. of oil-cut mud. The location, 1½ miles northwest of Fairfield, is about a mile from any other production.

Vic Gallagher 1 Toran, SE SE SE 16-6s-14w, which opens a new pool 4 miles northwest of Mt. Vernon, Posey County, Indiana, produced more than 25 bbl. of oil per hour in the first 28 hours after being placed on the pump for completion. Pay zone is the Waltersburg sand at 2,122-33 ft. This operator's 2 Toran, SW SE SE 16, a location west, has confirmed the discovery. It swabbed at the rate of 20 bbl. of oil natural in preliminary tests. It has the sand at 2,166-72 ft. The area is about a mile from other production.

Four miles northeast of Mt. Vernon, in the Bufkin area, Ryan Oil Co. has opened another new pool at its 1 Buchanan, NE NE NW 22-6s-13w, which pumped 114 bbl. of oil in 25 hours in completion tests in the Aux Vases formation at 2,766-72 ft. Location is about a mile northwest of the Welborn pool and about the same distance

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south of the Oliver South pool, opened earlier this year.

ILLINOIS SUCCESSFUL WILDCAT

White County: H. D. Atha 1 Hoskins, SW NW SE 36-6s-8e, IP 326 bbl., O'Hara 2,960-66 ft., TD 3,046 ft.

ILLINOIS WILDCAT FAILURES

Bond County: Miami Operating Co. 1 Adams, SE SE NW 4-5n-2w, dry, TD 3,400 ft.

Montgomery County: Stewart Oil Co. 1 Matli, SE SE SE 32-10n-3w, dry, TD 960 ft.

Saline County: Columbus Exploration Co. 1 Ozment, NE NW NW 15-9s-5e, dry, TD 2,761 ft.

White County: Miami Operating Co. 1 Harmon, NW NW SE 15-6s-8e, dry, TD 3,390 ft.

Skiles Oil Corp. 1 Poshard, NW NE SW 24-6s-9e, dry, TD 3,049 ft.

INDIANA WILDCAT FAILURE

Perry County: National Associated Petroleum Co. 1 American Cannel, C S½ NE SW 2-7s-3w, dry, TD 1,150 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Henderson County: National Associated Petroleum Co. 1 Denton, 22-P-22, dry, TD 2,750 ft.

National Associated Petroleum Co. 1 Hicks, NW NE NE 1-P-25, dry, TD 2,343 ft.

William G. Reynolds 1 Cosby, SW NE NW 21-P-25, dry, TD 2,416 ft.

Webster County: John L. Hedde 1 Tapp, 17-N-23, dry, TD 2,694 ft.

EASTERN KENTUCKY

ASHLAND.—In Big Sandy gas field, Pike County sector, United Fuel Gas Co. has completed 6581 Jonah Williamson for 1,107,000 cu. ft. of gas daily from Maxon (Mississippian) sand at a total depth of 2,154 ft. A 48-hour rock pressure showed 560 psi. In the same sector, on Grapevine Creek, Columbian Fuel Corp. completed 1326 Chesapeake Mineral Co. for 112,000 cu. ft. of gas daily from Devonian black shale at a total depth of 4,750 ft.

In Greenup County, 3-Y-79, Dixie King Oil & Gas Co. is testing show of oil in Berea sandstone found at about 550 ft. Bottom of hole is reported to be 600 ft., and operators may drill deeper.

Louisiana-Arkansas

Union County Gets Another Discovery

SHREVEPORT.—In east central Union County, Arkansas, Roberts Petroleum Co. is installing pumping equipment at the sixth discovery for the county this year. Production of 100 bbl. per day has been estimated for the company's 1 Lena. The well produced from perforations at 2,930-32 ft. in the upper Travis Peak. Five and one-half-inch casing was set at 3,020 ft. Total depth is 3,519 ft. Location is in 27-16s-14w, approximately 3 miles south of old Rainbow field and some 9 miles east of El Dorado. The same operator has set production pipe at 2,901 ft. at the 1 Ramsey estate, a north offset in 23-17s-14w.

Sinclair Oil & Gas Co. has cored four oil shows at its confirmation test in Fairview field, Concordia Parish, Louisiana. The 3 R. B. Sharp, east offset to the discovery, Sinclair 1 Sharp, 10-4n-9e, is bottomed at 6,906 ft. Operator is reaming down to core ahead. The test cored 10 ft. of oil show at 6,697-6,705 ft. in the Campbell sand of the Wilcox zone; 14 ft. at 6,754-69 ft.; 28 ft. of sand and shale with good oil odor and stain at 6,790-6,840 ft.; 45 ft. of sand and shale with good odor and stain at 6,856-6,906 ft.

NORTH LOUISIANA WILDCAT FAILURES

Catahoula Parish: Hunt Oil and Gulf Refining 1 Catahoula Parish School Board, 16-4n-5e, dry, TD 7,000 ft., elev. 53 ft., Wilcox 4,386 ft.

Concordia Parish: Hunt Oil and Gulf Refining 4 Metropolitan Museum of Arts, 4-3n-7e, dry, TD 8,006 ft.

Ouachita Parish: Parsons & Vaughn 1 Logan, 9-17n-4e, dry, TD 3,610 ft.

ARKANSAS WILDCAT FAILURES

Clark County: Dr. A. H. Conley 1 Beal, 31-10s-19w, dry, TD 2,462 ft.

Little River County: Dillingham, Chapman & Lynch 1 Hawkins, 33-12s-32w, dry, TD 3,598 ft., Kilpatrick 2,520 ft., Travis Peak 2,950 ft., Cotton Valley 3,570 ft.

Miller County: Sneed Bros. 1 Hervey, 28-14s-26w, dry, TD 6,074 ft., elev. 254 ft., base Massive anhydrite 3,295 ft., Cotton Valley 4,753 ft., Smackover 6,020 ft.

Nevada County: Arkoma Oil 1 McMillan, 19-14s-22w, dry, TD 5,752 ft., elev. 336 ft., Arkadelphia 930 ft., Nacatoch 1,080 ft., Tokio 2,125 ft., Massive anhydrite 2,590 ft., James 3,164 ft., Travis Peak 3,455 ft., Cotton Valley 4,300 ft., Buckned 5,516 ft., Smackover 5,718 ft.

Creole Production Up

Operated production of Creole Petroleum Corp. in Venezuela reached a new all-time high in October when the company's output averaged 683,874 bbl. daily.

The figure was an increase of 11,446 bbl. daily over production the previous month. Creole's net production plus purchased royalty oil in October was 721,593 bbl. daily, or 14,523 bbl. daily over September.

During October, Creole operated an average of 8.2 rigs compared to 8.6 during the previous month. Nine wells were completed. Seven were field wells, all producers, three in Quiriquire and four in Maracaibo. One exploratory well in Pedernales had an initial production of 1,833 bbl. daily and a total depth of 8,547 ft. The other exploratory hole was a 2,993-ft. dry hole in Quiriquire.

Of the company's operated production in October 523,918 bbl. daily came from the Lake Maracaibo area, 3,701 bbl. daily from Cumarebo and Mara, and 156,255 bbl. daily from Eastern Venezuela. During October, runs at Caripito averaged 64,096 bbl. daily, and at Amuay, 63,752 bbl. daily.

Salamanca Test Dry

The 1 Salamanca test drilled by Texas Petroleum Co. (Colombian Division) on Colombia's Caribbean Coast found basement at about 7,700 ft. with no production.

The well was the only strictly wildcat operation being carried out at present in Colombia. It was located about 20 miles east of Barranquilla on a sandpit. The well was reported to have encountered no good reservoir sand or limestone, the section being predominantly shale and silts. The Texaco affiliate continues as the most active operator in Colombia and is running several other rigs in the development of the Velasquez and Tetuan areas in the Magdalena Valley.

Austrian Well Blows Out

An apparently disastrous blowout has occurred in the Russian-operated field at Matzen in the Vienna basin of Northeast Austria. Reports from Vienna said oil and gas were erupting to a height of 90 to 100 ft. and that one of the derricks had caved in the hole. Heavy rains minimized the danger of fire, but Russian factory guards formed a cordon 600 yards from the blowout.

Cause of the blowout was described as a pipe burst, apparently a casing failure. It was said nothing could be done to halt the blowout and that the pressure would have to work off naturally.

Vienna residents were alarmed at the possibility of another oil-field fire such as occurred in August across the border in Czechoslovakia. A gas-well fire on the Laab structure southeast of Malacky burned from August 19 to August 27, and the glow was seen from Vienna some 30 miles distant.

Matzen, about 9 miles from Vienna, was developed by the Soviet Mineral Oil Administration on a structure mapped prewar by the Jersey Standard and Socony-Vacuum and Shell organizations. Reports indicate the Russians are taking at least 7,000 bbl. daily from the field.

The Russian organization recently discovered oil in Aderklaa field in the Vienna basin which previously had produced gas and a small amount of distillate. They are said to have recently taken all available equipment out of St. Ulrich field and moved it to Aderklaa and Matzen.

Financial Problems Solved

The financial difficulties encountered by the pioneer British petrochemical undertaking, Petrochemicals, Ltd., have been solved for the time being by a new loan from the British Finance Corp for Industry.

Higher-than-anticipated costs of construction and "running in" losses, among other things, forced the company to seek additional financial assistance *(The Oil and Gas Journal, September 14, 1950, page 76)*. The British Finance Corporation for Industry is making available up to £2,350,000 through 5 per cent prior-lien loan stock, 1953, but observers in London said a more radical shift in capital arrangements probably will be made by the company.

Gravity Survey Under Way

Independent Exploration Co., Houston, is now carrying out a gravity survey over the concession which was granted earlier this year to Gulf Exploration Co. in Barbados, B.W.I. The Gulf concession covers about half of the 166 sq. miles of the island and includes some offshore acreage.

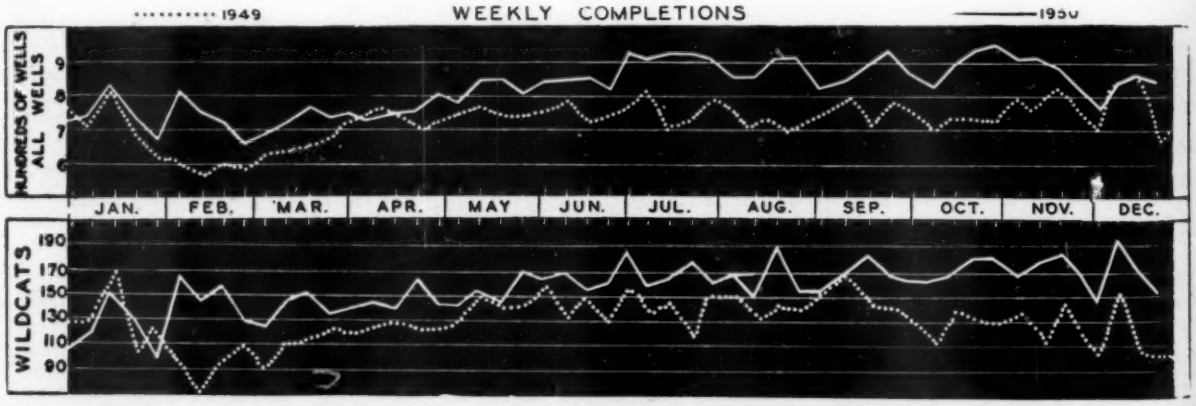
CURRENT STATISTICS

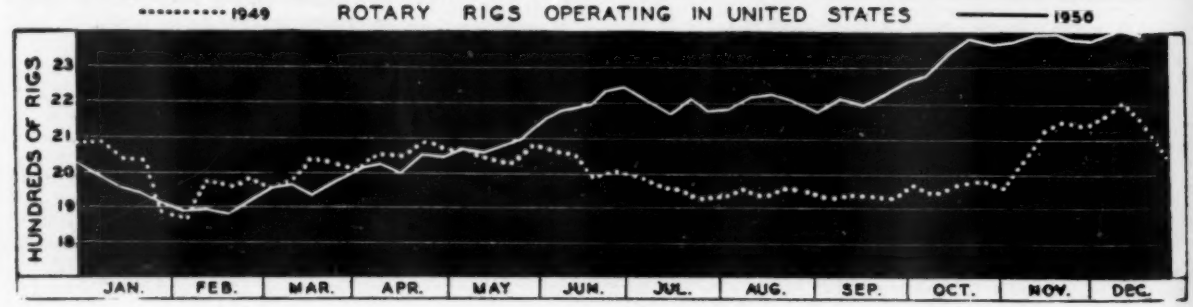
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED DECEMBER 23, 1950

	Total of all wells					Dec. 23		Wildcat completions and discoveries					Cumulative total, 1950				
	Comp	Oil	Gas	Dry	Footage	1950	1949	Oil	Dist	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	6	3	0	*3	8,676	642	922	0	0	0	0	0	0	0	0	0	0
Pennsylvania	12	5	2	†5	21,098	1,275	1,627	0	0	0	0	0	0	0	1	3	4
West Virginia	8	0	7	1	24,006	634	513	0	0	0	0	0	0	0	24	20	44
Ohio	23	6	11	6	49,433	1,010	1,080	0	0	0	0	0	2	0	2	15	19
Indiana	12	4	0	8	21,025	1,537	1,311	0	0	0	1	1	51	0	2	243	302
Kentucky	21	4	9	8	48,265	1,154	1,016	0	0	0	4	4	29	0	1	101	131
Illinois	46	34	0	12	118,239	2,811	2,650	1	0	0	5	6	55	0	5	601	661
Michigan	16	7	0	9	45,977	873	987	0	0	0	8	8	33	0	6	302	341
Kansas	92	49	7	36	294,054	3,862	3,300	2	0	0	17	19	114	0	13	651	778
Nebraska	18	13	0	5	55,364	157	40	0	0	0	3	3	8	0	4	62	74
Oklahoma	109	65	5	‡39	438,295	5,363	4,306	2	0	1	9	12	154	6	21	645	826
Texas	346	225	6	115	1,458,306	16,242	13,471	11	1	0	56	68	510	47	107	2,671	3,335
North Central (Dist. 7-B & 9)	122	66	0	‡56	333,693	4,926	4,385	7	0	0	22	29	222	2	30	1,038	1,292
West (Dist. 7-C & 8)	96	73	0	§23	509,467	4,911	3,243	3	0	0	12	15	101	3	6	537	647
Panhandle (Dist. 10)	14	11	2	1	43,697	878	937	0	0	0	0	0	1	0	2	19	22
Eastern (Dist. 5, 6, & 6-P)	42	37	0	§5	191,474	1,143	1,087	0	0	0	4	4	16	6	3	193	218
Gulf Coast (Dist. 2 & 3)	43	24	3	16	266,017	2,278	1,960	1	1	0	12	14	85	23	41	408	557
Southwest (Dist. 1 & 4)	29	14	1	14	113,958	2,106	1,859	0	0	0	6	6	85	13	25	476	599
Louisiana	51	26	7	21	284,146	2,407	2,353	0	0	0	6	6	48	16	6	223	293
Northern	36	17	7	12	111,729	1,302	1,427	0	0	0	3	3	14	3	2	114	133
Southern	18	9	0	9	172,417	1,105	926	0	0	0	3	3	34	13	4	109	160
Arkansas	7	3	0	4	33,352	397	325	0	0	0	4	4	10	0	0	88	98
Mississippi	1	0	0	1	10,165	298	331	0	0	0	1	1	11	2	0	113	126
Southeastern States	0	0	0	0	0	58	47	0	0	0	0	0	1	0	1	30	32
Montana	2	2	0	0	8,588	266	253	1	0	0	0	1	3	0	0	46	49
Wyoming	16	9	2	5	77,277	598	586	0	0	1	4	5	23	0	2	98	123
Colorado-Utah	4	1	1	2	21,988	114	135	1	0	0	2	3	7	0	4	65	76
New Mexico	11	11	0	0	70,049	601	498	3	0	0	0	3	15	1	4	56	76
California	43	31	2	10	191,658	1,803	2,501	0	0	0	8	8	32	0	4	383	419
Miscellaneous	0	0	0	0	0	53	61	0	0	0	0	0	0	0	0	28	28
Total United States	847	498	59	290	3,280,011	42,185¶	38,313	21	1	2	128	152	1,109	72	207	6,447	7,835
Total previous week	863	481	56	326	3,288,454	....	....	34	0	3	135	172	1,088	71	205	6,319	7,683
Total December 23, 1949	677	376	39	262	2,394,116	....	....	9	1	2	96	108	911	83	188	5,487	6,669

Service wells included: *3, †4, ‡2, §1. ¶Revised.





DAILY AVERAGE PRODUCTION FOR WEEK

	Dec. 23 crude oil	B. of M. Dec. demand	Dec. 16 crude oil
Alabama	2,650	2,400	2,500
Arkansas	81,800	88,000	81,550
California	964,100	955,000	964,700
Colorado	77,800	67,000	76,800
Eastern	52,600	67,000	52,000
Florida	1,575	1,600	1,575
Illinois	170,100	180,000	170,600
Indiana	30,300	31,000	30,200
Kansas	319,300	306,000	285,150
Kentucky	30,900	31,000	30,500
Louisiana	592,500	610,000	590,400
North Louisiana	116,550	.....	114,450
South Louisiana	475,950	.....	475,950
Michigan	39,700	47,000	39,700
Mississippi	99,750	112,000	103,200
Montana	22,300	24,000	22,400
Nebraska	5,500	6,000	4,700
New Mexico	130,800	142,000	130,800
Oklahoma	497,300	468,000	493,250
Texas	2,375,425	2,330,000	2,375,425
Dist. 1 (Southwest)	31,000	.....	31,000
Dist. 2 (Southwest)	141,350	.....	141,350
Dist. 4 (Southwest)	218,375	.....	218,375
Dist. 3 (Gulf Coast)	425,700	.....	425,700
Dist. 5 (Eastern)	40,075	.....	40,075
Dist. 6 (Eastern)	92,150	.....	92,150
East Texas field	269,700	.....	269,700
Dist. 7-C (West)	71,825	.....	71,825
Dist. 8 (West)	773,400	.....	773,400
Dist. 7-B (W. Central)	72,650	.....	72,650
Dist. 9 (N. Central)	149,200	.....	149,200
Dist. 10 (Panhandle)	90,000	.....	90,000
Utah	3,800	4,000	3,800
Wyoming	182,900	188,000	183,100
Total United States	*5,681,100	5,710,000	5,642,350
Change from previous week, up 38,750			
Canada	82,730	.....	86,610

Total U. S. production January 1-December 23 . †1,935,511,620 bbl.
Same period last year (crude plus cond.) ..... 1,811,984,575 bbl.

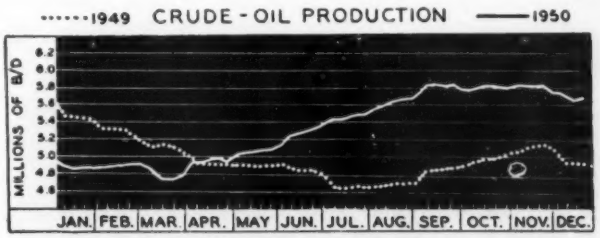
*Not including 103,145 bbl. condensate. †Including 34,964,265 bbl. condensate.

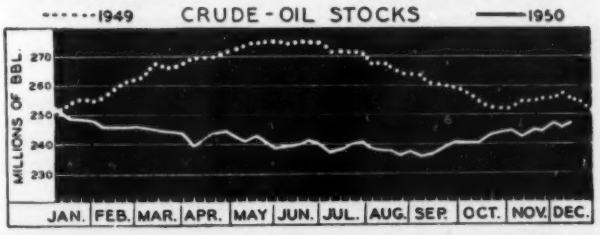
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

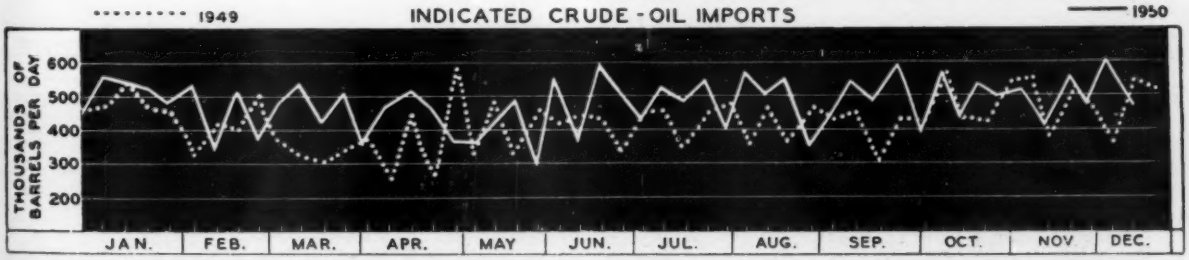
(Thousands of barrels)

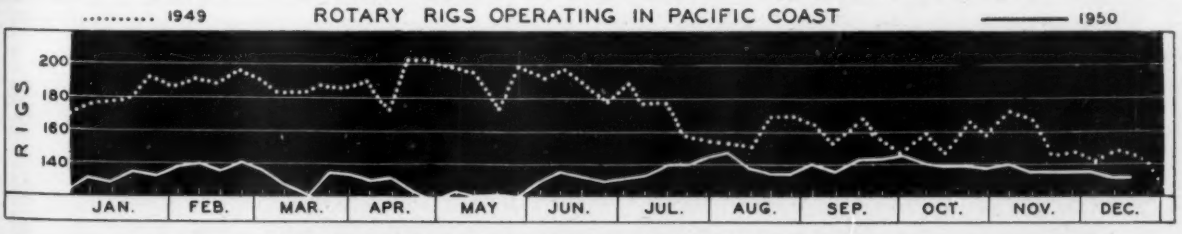
	Dec. 16, 1950	Dec. 9, 1950	Dec. 17, 1949
Pennsylvania Grade	2,170	2,129	2,857
Other Appalachian	1,267	1,257	1,916
Illinois, Indiana, Michigan	10,023	10,152	11,964
Arkansas	2,607	2,507	2,913
Louisiana	14,432	14,242	13,480
North	2,663	2,670	3,300
Gulf	11,769	11,572	10,180
Mississippi	2,477	2,344	2,404
New Mexico	7,111	6,742	7,529
Oklahoma and Kansas	38,368	38,135	37,611
Texas	119,809	119,497	117,369
East Texas	14,228	13,885	16,363
West Texas	46,428	46,235	43,619
Texas Gulf	29,128	29,416	29,931
Other Texas	30,025	29,961	27,456
Rocky Mountain	11,351	11,508	13,978
California	30,648	30,330	37,924
Foreign	7,009	7,499	8,031
Total	247,274	246,342	257,976

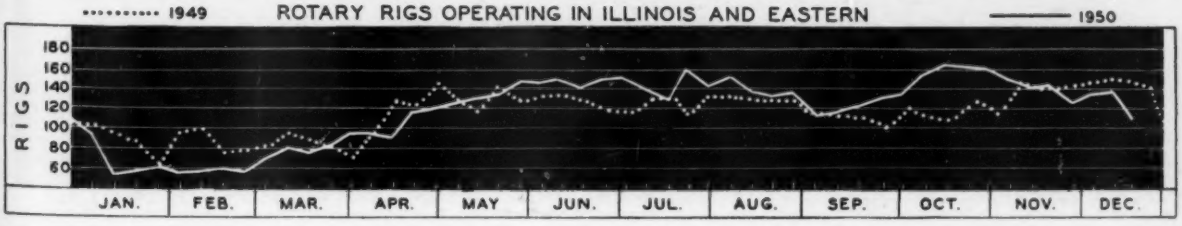
*Bureau of Mines.









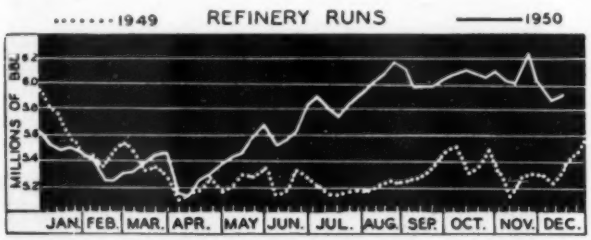


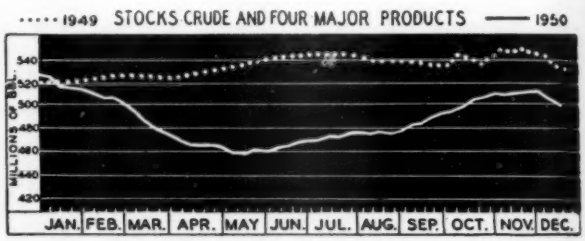
A.P.I. REFINERY REPORT, DECEMBER 16

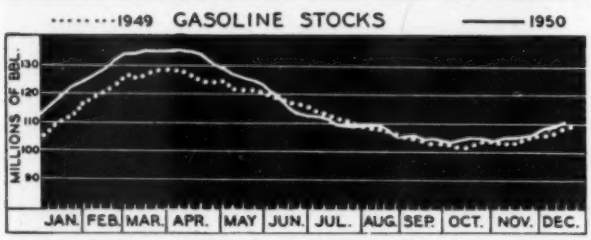
(Thousands of barrels)

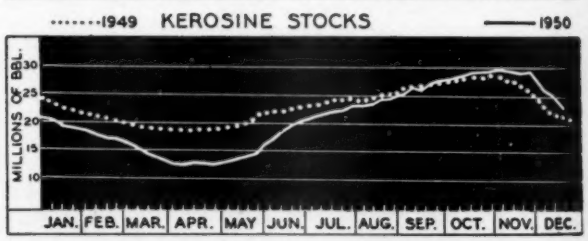
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, December 1949				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	920	413.6	33.1	248.3	200.9	23,643	9,311	24,341	9,530	854	345.8	38.5	197.8	214.8
Appalachian:														
District 1	81	43.4	5.3	13.3	9.9	2,893	396	803	408	95	44.2	6.3	14.7	13.4
District 2	61	28.7	4.1	6.3	18.1	1,268	179	195	173	63	32.0	5.3	8.1	14.1
Ind., Ill., Ky.	1,041	543.9	64.7	193.1	152.2	23,733	5,044	11,876	4,107	967	500.1	63.1	170.5	174.7
Okla., Kans., Mo.	489	269.2	19.3	108.7	62.1	11,353	1,144	8,150	1,204	437	242.0	18.1	86.3	59.7
Inland Texas	208	151.4	14.3	34.9	38.6	3,489	414	1,147	620	198	137.7	12.9	23.9	39.5
Texas Gulf Coast	1,461	655.4	110.2	331.3	263.2	16,986	3,627	13,437	5,688	1,324	610.5	114.6	285.8	245.9
La. Gulf Coast	496	251.2	50.0	126.4	62.7	7,020	1,647	3,669	2,005	455	231.4	63.1	83.5	64.4
N. La. and Ark.	60	24.4	5.1	11.6	7.4	2,218	264	853	136	72	31.0	7.0	12.1	15.7
Rocky Mountain:														
New Mexico	14	7.1	.4	2.9	3.7	97	25	40	31	13	7.2	.5	1.8	3.2
Other Rocky Mtn.	212	91.0	7.0	41.7	42.1	3,108	292	1,674	725	174	85.2	5.9	32.5	34.1
California	882	449.0	10.4	147.8	363.0	15,135	809	10,728	16,971	823	365.5	11.6	110.3	323.2
December 16, 1950	5,925	2,928.3	323.9	1,266.3	1,223.9	110,943	23,152	76,913	41,598	5,475	2,632.6	346.9	1,032.3	1,202.7
December 9, 1950	5,869	2,741.1	310.1	1,185.3	1,230.1	109,647	25,047	80,964	43,307	.....	.....	.....	.....	.....
December 17, 1949	5,389	2,618.4	365.0	1,037.6	1,150.9	108,490	22,267	82,450	62,786	.....	.....	.....	.....	.....

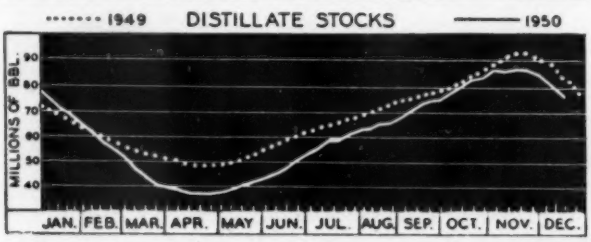
*At refineries including natural blended. †Finished and unfinished.

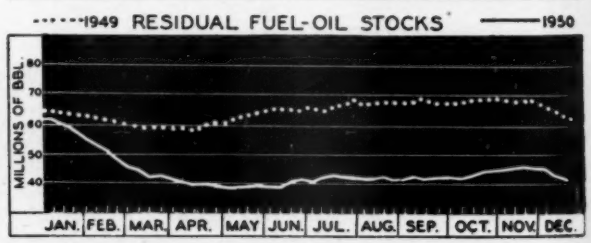




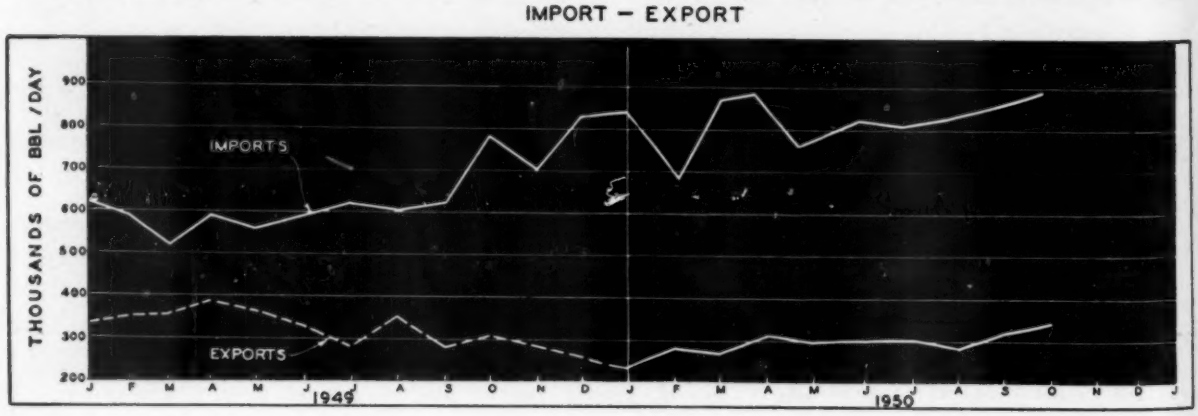








IMPORT — EXPORT



CRUDE PRICES
GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Okla-homa, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.80
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.25
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

HIGH demands for heating oils in December have resulted in a general increase in offers of premiums over posted prices for immediate shipment of products. Light and heavy-fuel inventories dropped almost 19,000,000 bbl. in the 3-week period ended December 16. Distillate fuel stocks decreased 10,000,000 bbl. Kerosine dropped 5,000,000 bbl., and residual was off 4,000,000 bbl.

Stock reductions in the period were 1,500,000 greater than in the same weeks last year despite the fact that production of light and heavy fuels gained 6,300,000 bbl. or 12 per cent.

In the Mid-Continent area heavy fuel has been particularly tight. Offers of $2 per barrel, Group 3, for immediate shipment have been reported. Shortage of cars has been a factor in some of the bidding. Shipper's ability to furnish cars has been valued by some marketers at as much as 10 cents a barrel. Primary residual stocks in the Mid-Continent and North Central areas dropped 8 per cent in the week ended December 16.

Much of market discussion of the past week dealt with possible effects of the request for a voluntary price freeze on supply of fuels. It is estimated that a residual price of about $2 per barrel for the Mid-Continent would increase residual production for the Group 3 market. The long-term trend toward lower residual yields has resulted from a need to raise refinery realization from a barrel of crude.

The requested price freeze also leaves unsolved the problem of abnormal price differentials between Gulf Coast and East Coast markets. Increased costs, due to rapidly rising tanker rates, have not been covered by increases in East Coast prices. Postings are unchanged in New York Harbor but most material is moving only to regular customers.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotation of leading suppliers as of December 26, 1950. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅛-10½	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11⅛-11½	13.5-13.75	11½-12
42-44 w.w. kerosine	9¼-9⅜	10-10.1	8¾-9
No. 2 straw fuel oil	8⅜-8⅝	9-9.25	7¾-8
No. 6 residual	$1.80-1.90	$2.25-2.30	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6⅞	6⅜	6⅝
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

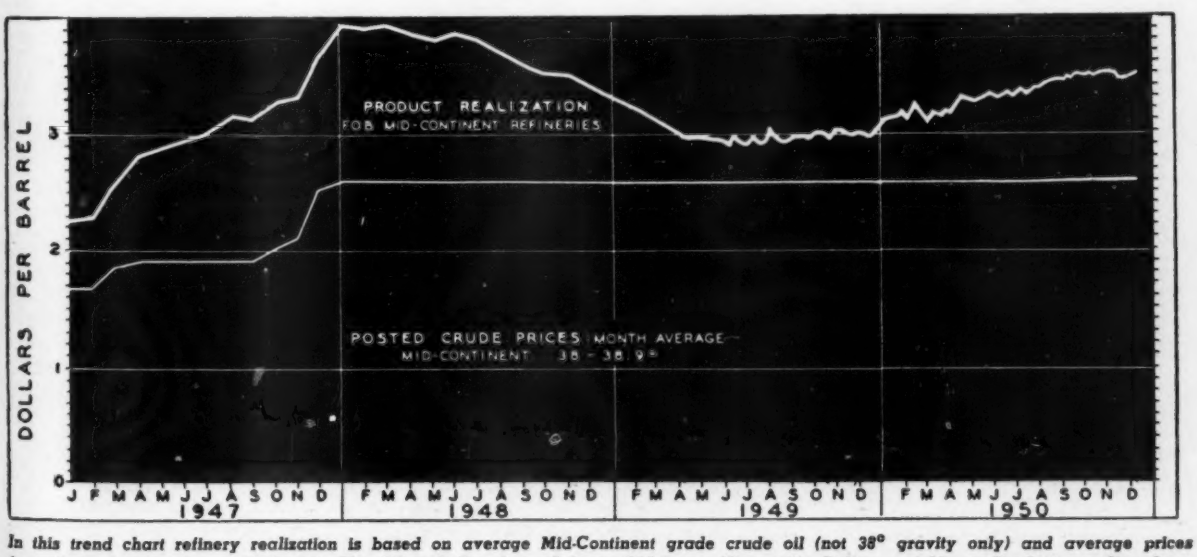
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	6.0



In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.51 for week ended December 16, $3.46 for previous week, and $3.08 for December 1949.

1950 Looms As Best Drilling Year in the Industry's History

by Polly DeArmond

PRELIMINARY cumulative tabulations for 11 months operations show that 1950 will be the greatest year of drilling in the history of the industry. The footage record (established in 1949) has already been topped by more than 7,500,000 ft. with another month yet to be added. Completions from January through November were but one well short of the all-time total-year peak set in 1948. The number of rigs standing and wells drilling as of November 30 also hit an unprecedented high.

1950 Standings

In completions, November ranks as the third most active month this year. Wells were down 155, or 3.7 per cent, from the record established in August, and were 85, or 2 per cent, under the second highest figure reported in June.

In total depth drilled, November occupies first place. Footage was up 76,569 ft., or 5 per cent, over the previous mark set in August, and topped the second-ranking month of June by 163,895 ft., or 10.9 per cent.

Comparisons With Previous Month

There were 262 more finished wells during November than in October. This represents a gain of 7 per cent. Footage was up 1,451,123 ft. over the preceding month, a 10.6 per cent increase.

The Southern section, made up of Louisiana, Arkansas, Mississippi, Alabama, Georgia, and Florida, noted the sharpest increases. Completions were up 64 wells, or 26.7 per cent, while footage jumped 303,131 ft., or 21 per cent. The area including Texas, New Mexico, and Arizona gained 45 completions, or 3.3 per cent, and 1,365,183 ft., or 2.3 per cent, over October.

California Increase Marked

California recorded one of the most marked increases for that state this year: up 23 wells, or 14.9 per cent, and 95,983 ft., or 14.4 per cent.

The Appalachian states continued their decline, dropping 23 completions, or 8 per cent, and 48,455 ft., or 9.5 per cent, from the previous month. The Mid-Continent, comprised of Oklahoma, Kansas, Nebraska, and Missouri, decreased 20 wells, or 2.2 per cent, and was down 45,817 ft., or 1.5 per cent. The North Central group (Indiana, Illinois, Kentucky, Ohio, and Michigan) reflected shallower drilling than in October, declining only 1 well, but falling 215,718 ft., or 14.2 per cent.

SUMMARY OF COMPLETIONS—NOVEMBER 1950

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500-ft.	Over 12,500 ft.	Total footage	Rigs and drilling
New York	52	26	0	26	52	0	0	0	0	0	75,000	60
Pennsylvania	140	64	18	58	123	17	0	0	0	0	238,000	269
West Virginia	51	8	32	11	24	26	1	0	0	0	145,383	§214
Ohio	103	36	25	42	58	45	0	0	0	0	213,913	149
Kentucky	90	47	6	37	78	12	0	0	0	0	151,124	108
Illinois	245	86	4	155	120	125	0	0	0	0	571,122	339
Indiana	111	33	4	74	99	12	0	0	0	0	198,199	212
Michigan	65	20	4	41	41	22	2	0	0	0	157,548	129
Kansas	355	173	31	151	50	302	3	0	0	0	1,149,112	442
Neb., Mo., Iowa	24	11	0	13	12	12	0	0	0	0	76,394	43
Oklahoma	490	292	16	182	118	263	86	12	10	1	1,846,678	860
Texas	1,632	1,044	56	532	455	554	434	157	26	6	7,189,917	1,447
North	287	177	0	110	146	94	47	0	0	0	862,737	182
West Central	239	119	3	117	127	95	17	0	0	0	632,919	147
West	467	370	1	96	75	108	213	50	5	6	2,499,050	557
Panhandle	65	40	19	6	4	58	3	0	0	0	207,248	102
East	113	75	10	28	15	65	21	11	1	0	514,312	81
Gulf Coast	229	134	15	80	17	58	78	58	18	0	1,430,760	205
Southwest	232	129	8	95	71	66	55	38	2	0	1,042,891	173
Louisiana	228	117	17	94	56	43	41	38	42	8	1,411,013	301
Northern	121	60	12	49	53	30	28	8	2	0	463,006	138
Southern	107	57	5	45	3	13	13	30	40	8	948,007	163
Arkansas	46	31	0	15	16	21	8	1	0	0	128,707	50
Mississippi	22	8	0	14	0	2	15	3	2	0	155,588	27
Ala., Ga., Fla.	7	4	0	3	0	5	0	1	0	1	39,497	6
Montana	32	16	2	14	19	12	1	0	0	0	79,699	56
Wyoming	56	24	1	31	13	28	12	3	0	0	226,689	139
Colorado	15	6	2	7	0	2	13	0	0	0	81,879	50
Utah	0	0	0	0	0	0	0	0	0	0	0	20
New Mexico	50	33	8	9	12	29	5	3	1	0	188,588	146
California	177	134	7	36	38	91	30	12	5	1	761,864	234
Miscellaneous	§3	0	0	§3	0	0	1	0	1	1	28,605	§16
Total November 1950	3,994	†2,213	233	*1,548	1,384	1,623	652	230	87	18	15,114,499	‡5,317
Total October 1950	3,732	1,999	275	1,458	1,357	1,539	539	196	81	20	13,663,376	5,099
Total November 1949	3,490	1,980	264	1,246	1,440	1,386	448	152	56	8	11,742,450	4,505
Cumulative 1950	39,777	22,400	2,605	14,772	14,582	15,899	6,193	2,072	889	142	145,580,905	....
Cumulative 1949	35,723	20,165	2,633	12,925	13,772	14,535	4,627	1,833	831	125	126,247,728	....
Western Canada	115	82	1	32	26	45	42	2	0	0	451,682	....
Cumulative 1950	935	700	39	196	73	592	258	11	1	0	3,672,756	....

*Incl. 109 service wells: N. Y. 26, Pa. 50, Ohio 4, Ill. 2, Kans. 12, Okla. 6, No. Tex. 3, W. Cent. Tex. 2, Tex. Gulf 1, Ark. 3. †Incl. 42 distillate wells: Okla. 5, W. Tex. 6, Tex. Pan. 1. Tex. Gulf 11. No. La. 3, So. La. 6, Miss. 1. ‡Incl. all wells drilling and/or rigged up at end of the month. §Misc. completions incl. 1 dry Ariz. at 5,765 ft., 1 dry Nev. at 10,314 ft., 1 No. Dak. at 12,526 ft.; misc. rigs incl. Ariz. 4, Dakotas 6, Idaho 2, Nev. 4. W. Va. rigs incl. Md. 7.

EQUIPMENT MEN . . . in the News

Adams Elected Vice President of Bowser

Joseph F. Adams, assistant to the chairman of the board of directors of Bowser, Inc., has been elected a vice president of the company and member of the board of directors, according to an announcement by R. Hosken Damon, chairman of the board of directors. Prior to his affiliation with Bowser in July of this year, Adams was vice president in charge of marketing of Barnsdall Refining Co., Tulsa.

Franks Names Wilkinson Chief Products Engineer

A. H. WILKINSON

A. H. Wilkinson has been named chief products engineer for Franks Manufacturing Corp., according to W. B. Woody, vice president in charge of engineering.

With Franks the past 9 years, Wilkinson was formerly with Skelly Oil Co. and the U. S. Corps of Engineers. He attended Oklahoma A. & M. College and University of Oklahoma.

Edward Promotes Mahlman To Sales Office Manager

William G. Mahlman, for 3 years supervisor of order analysis for both Edward and Nordstrom valves, has been promoted to sales office manager of Edward Valves, Inc., East Chicago, Ind. He succeeds Herbert J. Rowe, who has been called back to the U. S. Marine Corps.

Mahlman attended Carnegie Institute of Technology in Pittsburgh. For 12 years after, he was employed in sales activity in the Nordstrom Valve Division of Rockwell Manufacturing Co. of Pittsburgh. He came to Edward in 1947.

Loving to Direct Du Pont Explosives Sales Staff

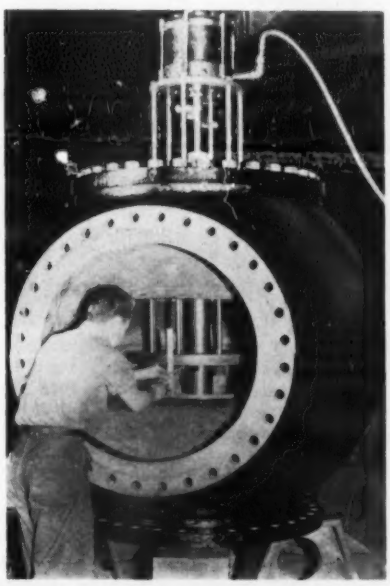
George H. Loving has been appointed director of sales of E. I. du Pont de Nemours & Co., Inc., explosives department, succeeding Charles B. McCoy, who was transferred to the electrochemicals department as assistant general manager.

Loving joined Du Pont in 1930, as a chemist at the eastern laboratory, Gibbstown, N. J. He was made a special assistant to the director of the chemical division of the explosives department in 1939, and regional sales correspondent in 1942. In October of that year he went to Huntington, W. Va., as chief clerk of the branch sales office. In May 1943 he was made technical assistant to the manager of the technical division, and since October 1943 has served as an assistant director of sales in the explosives department.

Kieley & Mueller Builds Large Control Valves

What are believed to be the largest double-ported control valves ever built have recently been completed by Kieley & Mueller, control-valve manufacturers of North Bergen, N. J.

The construction of these giant control valves, which have 36-in. pipe connections, involved some very delicate engineering. Despite their size, the valves had to fully open and fully close within 1 second, and provide absolutely tight shutoff. Furthermore, the guiding problem for the valve plug was intricate, as installation requirements made it necessary for the valves to be on their sides. This problem was solved by equipping the guide posts with linear-type roller bearings which permit friction-free movement of the valve plug between open and closed positions.



The 36-in. angle double-ported control valves recently constructed by Kieley & Mueller.

Christian Joins Marsteller Co. as Senior Associate

R. C. CHRISTIAN

Richard C. Christian, formerly market analyst for Rockwell Manufacturing Co., Pittsburgh, will join The Marsteller Co., Chicago marketing consultants, on January 1 as senior associate.

Christian is a graduate of Miami University, with a master's degree in business administration from Northwestern University. He took other specialized marketing and engineering work at Biarritz American University, Biarritz, France; at Denison University, and The Citadel.

Prior to joining Rockwell, he was with Oxford Research Associates and was a market analyst at National Cash Register Co.

Williams Shifted to Export Sales Department by Totco

E. E. WILLIAMS

H. H. (Pete) Peters, vice president of Technical Oil Tool Corp., Ltd., has announced the transfer of E. E. (Bill) Williams to the Totco Export Sales Department. Williams has been located in Bakersfield, Calif., for the past six years where he served as Totco representative.

Peters stated that Williams will leave shortly on an extended trip throughout all oil-producing areas in South America, Central America, and Mexico. He will represent both Totco and Lucey Export Corp., handling Lucey's full line of equipment.

Hellstrom Made Manager of American Air Filter Zone

John Hellstrom, vice president of American Air Filter Co., Inc., Louisville, has moved to San Francisco to become manager of the newly created Pacific division. Under his direct supervision will be the business activities of both American Air Filter Co. and its Herman Nelson Division at Moline, Ill., in the Pacific territory. The Pacific Division includes the of-

fices and representatives in the states of California, Oregon, Washington, Idaho, Montana, Utah, Arizona, New Mexico, and the western part of Texas.

Reynolds Joins Selas As Petroleum Engineer

David G. Reynolds has been appointed to the staff of Selas Corp. of America, heat-processing engineers, Philadelphia, as petroleum engineer in the refinery division, according to a corporation announcement.

Most recently Reynolds was petroleum process engineer and operator for The Lummus Co. He is a graduate of the Carnegie Institute of Technology.

E. L. Oliver Elected to Oliver Executive Committee

E. L. OLIVER

Oliver United Filters, Inc., Oakland, Calif., recently elected Edwin Letts Oliver, Jr., as vice president and member of the executive committee.

Oliver assumes the duties of P. A. Hoyt, until recently executive vice president, who was granted a 6-month leave of absence.

Oliver, a graduate of University of California, has been with the company for the past 17 years, a director for 9 years, and executive assistant for several years. Oliver United Filters maintains sales offices at New York, Chicago, and Oakland; two large factories at Hazleton, Pa., and Oakland, Calif., and a world-wide organization of sales and manufacturing representatives.

Oliver retains his position as director of the company and will be succeeded as secretary by L. R. Boling, who will continue in office as treasurer and controller.

Cunningham New Bendix Chicago Radio Manager

William L. Cunningham has been appointed district sales manager with headquarters at Chicago, it has been announced by Arnold Rosenberg, general sales manager, Bendix Radio Communications Division of Bendix Aviation Corp.

Cunningham succeeds Robert B. Barnhill who has been transferred to Baltimore to manage the mobile and automotive radio sales department on a national scale. Since 1947, Cunningham has served as a sales engineer at the Bendix Chicago office. Before this, he was service manager at the Bendix Radio main plant in Baltimore.

Harrison Completes 30 Years With Hughes

Hughes Tool Co.'s Gulf Coast division sales manager, Wade Hampton, with 32 years of service, and G. J. Meyer, assistant to vice president, sales, a 33-year man, look on as vice president, sales, M. E. Montrose pins a 30-year diamond-studded service emblem on C. (Slim) Harrison, special field representative. The combined service of these three oldtimers totals 95 years.

C. (Slim) Harrison has rounded out 30 years' service with Hughes Tool Co. this month.

Harrison was the fourth man to join the Hughes' sales organization which now numbers more than 300, located over United States, Canada, Europe, and South America.

Before coming to Hughes, he worked as a driller in several of the early Gulf Coast oil fields, including Spindletop and Goose Creek. He was later employed by an oil company for several years as a scout and as a drilling superintendent in Louisiana.

Harrison became acquainted with Howard R. Hughes, founder of the firm, in Spindletop field around 1901. Although 83 years of age, Harrison remains active in the sales department as a special field representative in the Gulf Coast area.

O. A. Beech Elected Head Of Beech Aircraft Corp.

MRS. O. A. BEECH

Mrs. O. A. Beech has been elected president and chief executive officer of Beech Aircraft Corp.

Active in the aviation industry since 1925, as cofounder of the company which she now heads, Mrs. Beech has served as a member of the board of directors and as secretary-treasurer since the company was organized in 1932.

Mrs. Beech's first job in the industry was as secretary-bookkeeper and later office manager and secretary to the president of Travel Air Manufacturing Co., an enterprise which she helped her husband build from a small start. For a brief period Walter H. Beech was a director and officer of that corporation but on April 1, 1932, he organized Beech Aircraft Co., predecessor to the present corporation. Mrs. Beech became secretary-treasurer of the new company. In 1936, she became also a member of the board of directors.

Mrs. Beech's election as president and chief executive officer of Beech Aircraft fills the vacancy that has existed since the death of her husband as a result of a heart attack on November 29.

Other officers elected at the annual meeting of stockholders are: John P. Gaty, vice president and general manager; T. A. Wells, vice president and chief engineer; Frank E. Hedrick, vice president and coordinator; John A. Elliott, treasurer; and L. Winters, assistant secretary.

Retaining places on the board of directors were: O. A. Beech, John P. Gaty, T. D. Neelands, Dwight S. Wallace, and T. A. Wells. Newly elected as a director was Frank E. Hedrick, vice president of the company.

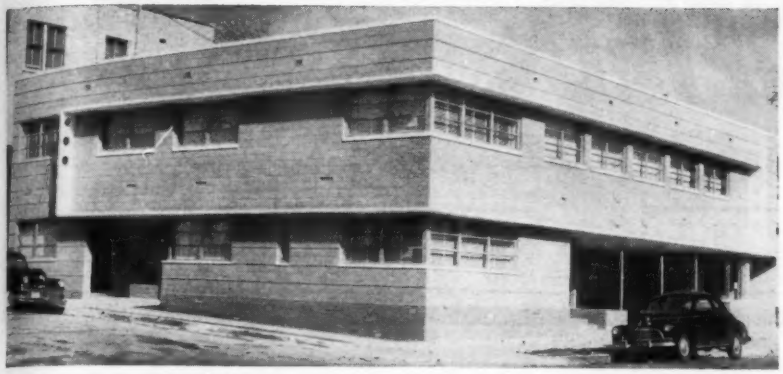
Chicago Bridge & Iron Moves Woleben to Houston

W. H. Woleben has been transferred from Chicago Bridge & Iron Co.'s general sales office in Chicago to its Houston sales office.

Woleben worked in Chicago Bridge & Iron's drafting room in Birmingham from June 1948 until March 1949, when he was transferred to a field erection crew to gain experience. He was in training for sales work at the company's general sales office from March 28, 1950, until he was transferred to the Houston office.

Chicago Bridge & Iron Co.'s Houston office is located in the National Standard Building. S. C. Hamilton is manager and J. U. Blanchard is contracting engineer.

Independent Exploration Moves Division Offices



Independent Exploration's new headquarters at Fort Worth.

The North Texas division offices of Independent Exploration Co. have recently been moved to larger quarters in a newly constructed two-story building at 740 West Fifth Street in Fort Worth. The entire upper floor at this new location takes the place of two suites of offices that Independent formerly occupied in the Electric Building and the Bewley Building in Fort Worth.

John H. Wilson, vice president, is in charge of the offices. Other staff members include David B. Campbell, assistant manager; George Harrington and George B. Clark, in charge of the correlation of geophysical and geological work; Miss Cal Yates and Mrs. Josa Runnfer, draftsmen; and Mrs. Archie Smith and Mary Cherry.

I. A. Jones Will Manage Oilwell's El Dorado Store

Ivan A. Jones has been named manager of Oil Well Supply Co.'s field store at El Dorado, Kans., Mark Barkhurst, Mid-Continent division manager for this U. S. Steel subsidiary, has announced.

Jones has been district representative at Wichita, Kans., for the past several months and prior to that he served in similar capacities at Ellinwood, and Great Bend, Kans. Jones joined Oilwell in September 1948.

Marsh Corp. to Finish Large Addition to Plant

Construction is well under way for a large addition to the manufacturing plant of Jas. P. Marsh Corp., in Skokie, Ill. Measuring about 225 by 75 ft., the addition will increase manufacturing space by about 17,000 sq. ft.

Although the company completed and occupied the Skokie plant only recently, demand for Marsh pressure gages, dial thermometers, radiator valves, steam traps, and other heating specialties is responsible for added manufacturing facilities.

Thompson Appointed to New Sales Position

J. J. Thompson has been named manager of the sales-personnel and training division of Worthington Pump & Machinery Corp., at Harrison, N. J., according to an announcement by W. H. Feldmann, vice president in charge of sales.

A 17-year Worthington veteran, Thompson became an estimator in the Chicago office after graduating from Purdue University with a B.S. degree in mechanical engineering. He served Worthington successively as an application engineer in the Buffalo compressor division from 1933, a general line salesman in the Chicago office from 1934, an application engineer in the centrifugal pump sales division in Harrison from 1939 to 1941, and as assistant district manager of the Cincinnati office from 1945.

Tretolite Starts Building New Chemical Unit

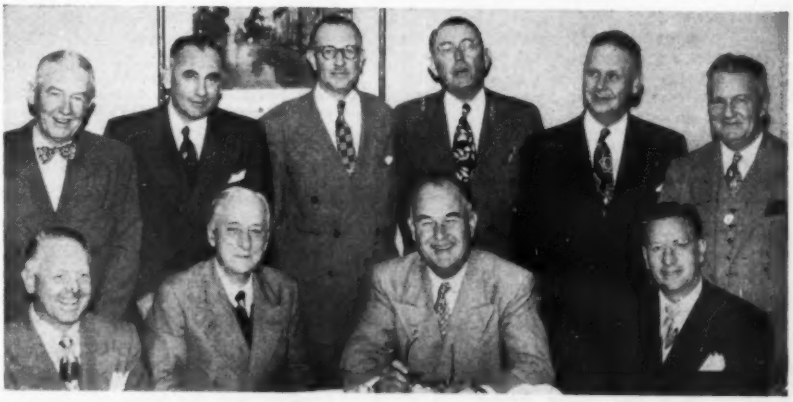
Tretolite Co., manufacturing chemists, have started construction of a new chemical unit at their Webster Groves, Mo., plant. Design, procurement, and construction management are being handled by R. W. Booker & Associates of St. Louis with William H. & Nelson Cunliff Co., doing the general building work. Mechanical contracts for process installation will be let in the near future with completion scheduled for the spring of 1951.

Porth Completes Eurasian Trip for A. O. Smith

Walter H. Porth, manager, International Division, A. O. Smith Corp., Milwaukee, has just returned from a 12-month trip through most of the Marshall-plan countries of Europe, and the Middle East, during which he visited A. O. Smith's old distributors and appointed new ones.

He also was engaged in the procurement of some materials and equipment for A. O. Smith, thus contributing to the supply of dollars for United States exports.

Nomads' Board of Regents Meets at Los Angeles



The National Board of Regents of Nomads held its annual meeting in the California Club, Los Angeles, following luncheon, on Monday, November 13, during the A.P.I. meeting in that city. Those in the picture seated are: J. C. Basehart, The Buda Co., Dallas-Fort Worth; H. M. Cosgrove, executive secretary, board of regents, Tulsa; Fred C. Ripley, Jr., International Derrick & Equipment Co., Los Angeles, secretary-treasurer, board of regents. Standing are: Edmond L. Lorehn, Cameron Iron Works, Houston, alternate for Ed M. Fontaine; Brad Mills, American Association of Oilwell Drilling Contractors, Dallas-Fort Worth; Val R. Wittich, Jr., export sales, New York; C. F. (Bud) Vincent, Byron Jackson Co., Houston, alternate for C. B. McDonald; H. M. Cooley, Bethlehem Steel Co., Tulsa; and A. V. Simonson, New York, export sales, alternate for Russell D. Heath. On Monday night, November 13, representatives of all five chapters held a reception and buffet in the Rendezvous Room of the Biltmore Hotel, from 7 to 9 p.m., arrangements for which had been made by the Los Angeles chapter. More than 400 persons, including ladies and foreign guests, were in attendance at this highly successful function.

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$12.00 a column inch one issue . . .
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EQUIPMENT FOR SALE

USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES, E. A. KELLY, BOX 861, OKLAHOMA CITY. PHONE 5-6407.

WELL equipment. New and used spudders, rotaries, core drills, all sizes and types. Cable tools, drill pipe, bits, pipe. Fishing tools rented. Everything for well service. Pressey & Son, Pueblo, Colo.

FOR SALE: 1946 Cardwell QST Servicing unit with 48′ 7″x8″ Cardwell Mast. Suitable for 3500′ 2½″ tubing. Complete set tubing and rod tools. Mounted on 3-Ton EH Mack truck. Frank Jones, McPherson, Kansas.

NEW OIL WELL CASING FOR SALE—Various sizes and quantities, will also furnish oil strings for carried interests. Write or wire Box D-819, The Oil and Gas Journal, Tulsa, Oklahoma.

Several Army Surplus 4½″ x 6″ Gaso Duplex 1860 Pumps—two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

H. H. COFFIELD
ATTN.: W. H. Orr
Phones: 132—Rockdale, Texas
A-86064—Houston, Texas

FOR SALE

DRILLING STEMS; 2¾″, 3″, 3¼″, 3½″, 4″, 4½″, 4¾″ and 5″ in diameter, and from 22 feet to 40 feet long. Used, but in good condition.

HERMAN STRAUSS, INC.
Wheeling, W. Va. Tele. 5170 Wheeling

14,000 ft.—10 inch

CAST IRON BELL AND SPIGOT PIPE

Class B—approximately

63 lb. per foot

Priced below mill for Immediate Delivery

Write—Wire—Phone

Sonken-Galamba Corp.

2nd and Riverview (X-660)
Kansas City 18, Kansas
THatcher 9243

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO
Box 107, Red Fork Station, Tulsa, Oklahoma

DRILLING rig located at Greggton, Texas, yard, and consisting of complete steam rotary drilling rig without drill pipe, including 2 120 H.P. oil well boilers, 1 6″ Union Tool unitized draw works, 1 12x12 Ajax roller bearing steam engine, 1 14½x7½x18 Ideal mud pump, Ideal rotary table, swivel, crown block, traveling block, etc. Contact Rudco Oil & Gas Company, Box 2018, Tyler, Texas.

COLLARS—COLLARS—COLLARS
Large quantity 7″ 10 V thread collars. Call Edco Pipe & Supply Co., 933 or 357, Drumright, Oklahoma.

FOR SALE

9—230 H.P. Bessemer Type 10 Engines with compressors. Steel Buildings. Valves and Fittings complete for installation. Located Salem, Illinois Oilfield.

ENGLE PETROLEUM, INCORPORATED
Box 655, Evansville, Indiana
Telephone 5-5179

CASING—5½″ and 7″ No. 1 grade, lapweld and seamless.
TUBING—2″, 2½″, and 3″ regular and upset.
WATER WELL CASING—5⅝″ and 6¼″
Attractively priced.

D. A. MORITZ CO.
9th & B&O, Braddock, Pa.

EQUIPMENT FOR SALE

FOR SALE: Pulling 100 wells in Ohio. Approximately 100,000′ 2″ 4½# Tubing, 200,000′ 2″ 3.75# Line Pipe, 50,000′ 4⅞″ Casing, 70,000′ 6¼″ Casing, 5,000′ 8¼″ 24# Casing, 3,000′ 10″ 32# Casing. All Lapweld. Also 2,200′ 16″ OD x ⅜″ wall P.E. Used Line Pipe. Send us your inquiries. Buckeye Supply Co., Zanesville, Ohio.

FOR SALE: Westcott, Foxboro and Emco Gas Meters, Geo. R. Milner. Box 124, Okmulgee, Oklahoma.

3—160 CUBIC FOOT Air Compressors. Diesel: Gasoline. J. C. Morrison, Midwestern Drillers, Liberal, Kansas. Phone 2441.

PIPE FOR SALE

Seamless

5400′ New (Wrought iron) 5½″ OD 13 & 17# 10 VT Range 2, f.o.b. Brush, Colo. area
3000′ J55 A1 Used 5½″ OD 15½# 8 RT Range 2 f.o.b. N. Cen. Ohio area
3000′ J55 A1 Used 5½″ OD 17# 8 RT Range 2 f.o.b. N. Cen. Ohio area
5000′ H40 A1 Used 5½″ OD 14# 8 RT Range 2 f.o.b. Cen. Michigan area
800′ A1 used 10¾″ OD 45# Drive Pipe Range 1 Cen. Michigan area

Lapweld

4000′ A1 Used 7″ OD 17# 10 VT Range 1 f.o.b. Pittsburg area
3200′ A1 Used 7″ OD 20# 10 VT Range 1 f.o.b. Pittsburg area

MICHIGAN CARLON PIPE COMPANY
20120 Livernois Detroit 21, Mich.
DIamond 1-1400

LINE PIPE FOR SALE

30,000′ 2⅜″ OD 3.75# & 4# Good Used Lapweld T&C Range 1 Line Pipe.
50,000′ 6⅝″ OD 18.97# Excellent Grade Used Lapweld, Cleaned, Beveled Ends, 20′ RML.
3,950′ 6⅝″ OD 18.97# Strictly No. 1 Electric Weld, 45′ Lengths, Plain Ends.
20,000′ 8⅝″ OD x .322″ Wall 28.55# Used No. 1 Grade Lapweld, 30′ to 40′ Lengths, Beveled Ends, FOB Texas Point.
4,000′ 10¾″ OD 34# Good Used Lapweld, Plain Ends, Random Lengths.

CASING & TUBING

25,000′ 2⅜″ OD 4# Good Used Lapweld Range 1 Tubing, 11½ V-Threads and Collars.
5,000′ 5½″ OD 10# Reconditioned Seamless Casing, New 11½ V-Threads and New 5½″ Collars (Recommended for Shallow Wells).
7,000′ 7″ OD 20# Good Used Lapweld Range 1 T&C Casing, 10 V-Threads.
3,500′ 8⅝″ OD 25# Good Reconditioned Casing, T&C, 8 V-Thds., Range 1.
3,000′ 10¾″ OD 35.75# Good Used Lapweld T&C Casing, Range 1, 8 Thread.

OTHER SIZES OF LINE PIPE, SEAMLESS TUBING IN SUITABLE SUBSTITUTE SIZES FOR STANDARD PIPE (EXCELLENT FOR GAS, GATHERING AND FLOW LINES), CASING AND TUBING AVAILABLE FOR IMMEDIATE DELIVERY.

FOR FURTHER INFORMATION, WIRE OR PHONE AT ONCE

A. J. STRUBEL, Broker

SIDney 1791 (Day Phone) HUDson 8152 (Night Phone) . . . 4946 Murdoch, St. Louis, Mo.

EQUIPMENT FOR SALE

1—4'-0" ID x 40'-6" x 1¼" thick Tower. No trays. Tri-State Supply Company, Box 610, Mt. Pleasant, Texas.

EQUIPMENT WANTED

WANTED TO BUY: 2000 feet of 4½" left-hand drill pipe with tool joints. Texas Water Wells, Inc., 951 McCarty St., Houston, Texas.

HELP WANTED

POSITION Available February 1, 1951, Assistant or Associate Professor with Masters degree or higher in Petroleum Engineering to teach reservoir engineering courses in rapidly growing school with excellent laboratory and other facilities. Qualifications will determine salary, but will be comparable to industry. Location Southwest. Box D-765, The Oil and Gas Journal, Tulsa, Oklahoma.

ANALYTICAL Chemist with 3-5 years' experience in light hydrocarbon and petroleum chemicals analyses to head plant control laboratory in the Ohio River Valley area. Box D-810, The Oil and Gas Journal, Tulsa. Oklahoma.

WANTED: Assistant Plant Superintendent for Natural Gas Plant in vicinity of Alexandria, Louisiana. House and utilities furnished. Box D-802, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICISTS WANTED

Positions available immediately for experienced seismologist and gravity interpreter for supervisory work with large, well established Oil and Gas Company. Permanent location, salary open, Geological background and Gulf Coast experience desirable, but not required. Give age, educational background and complete details of experience in first letter. Personal interview to be arranged. Our employees know of this ad. Reply to

Box D-814, The Oil and Gas Journal, Tulsa, Oklahoma

Executive Engineer

Unusual opportunity for aggressive person to act as general manager of newly formed subsidiary of well-known pipe fabricator. Subsidiary will erect power and industrial piping. Candidate should: (1) be graduate engineer; (2) age 35-42; (3) have extensive experience in piping; (4) possess balanced background in sales, engineering and management. Base location N. Y. Metropolitan Area. Salary plus possible incentive arrangement. Write giving complete resume of personal facts, education, experience and compensation desired.

BOX D-812
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

HELP WANTED

REPUTABLE Wichita, Kans, Corporation entering oil business, plans to spend considerable amount money for development and exploration. Want Geologists who can work up drilling deals, get farmouts. Managerial ability, etc. Must be experienced Western Kansas geology. Good salary, interest in deals. Replies confidential. Box D-869, The Oil and Gas Journal, Tulsa, Oklahoma.

ELECTRICAL ENGINEER: New large oil pipeline company requires electrical engineer to handle design, construction and devise maintenance procedures, all classes equipment to 5-KV switch gear. Some familiarity with sub-stations to 110-KV, 5000-KVA desirable but not required. No communications or electronics involved. Include full professional and personal details and minimum salary, first letter. Job is permanent. Box D-761, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, with the necessary experience to qualify for either District Geologist or special problems geologist in structure and stratigraphy. Headquarters in Shreveport with established producing oil company. Replies confidential. Box D-801, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPANDING program of well known geophysical company provides excellent opportunity for a few qualified Party Chiefs. Applicants should have not less than three years experience as Party Chief, be proficient in interpretive skill and have proven ability to administer crew. Liberal compensation based upon competence of applicant. Box D-813, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEERS
OPERATIONS SUPERVISORS
PERFORATOR OPERATORS

Only Experienced Men Need Apply

WRITE ONLY

WELEX JET SERVICES, INC.
3909 Hemphill Street, Fort Worth 9, Tex.

Chemical Process Engineers

Qualified to prepare engineering studies and detailed process designs for petroleum and chemical fluid process plants. Salaried position; location in Boston. In reply please state educational qualifications, work experience, and salary desired. Present employers will not be contacted before personal interview.

STONE & WEBSTER ENGINEERING CORPORATION
49 Federal St., Boston 7, Mass.

REFINERY POSITIONS AVAILABLE

Integrated oil company has following positions open in its modernized refinery located in southwest:

NIGHT SUPERVISOR — CRACKING AND POLY PLANT: Responsible for direct supervision of catalytic cracking and poly plant operations, plus general supervision over all refinery workers during night shifts. Must have five to ten years' refinery experience and be thoroughly familiar with all phases of refinery operations.

INDUSTRIAL ENGINEER: Responsible for the investigation of work methods in the processing, maintenance and clerical functions for the purposes of reducing costs, improving quality, or raising yields. Must be graduate Industrial Engineer with three to five years' experience and be familiar with refinery operations.

PERSONNEL ASSISTANT: Responsible for aiding refinery manager on problems relating to industrial relations policies and procedures, interpretation of union contracts, and settlement of grievances. Also responsible for maintaining personnel records, classification and seniority records, and for preparing work schedules. Must have three to five years' personnel and industrial relations work with emphasis on handling grievances and working with union representatives.

In letter, give education, age, military status, experience, and salary expected.

Box D-806, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

Graduate Engineers

GOOD OPPORTUNITIES

for

CHEMICAL ENGINEERS: Five to ten years' experience in Chemical Operations or Development. Work in Application of unit operations, evaluations and economic studies leading to cost reduction. Must be graduate, free to travel.

ENGINEERS FOR UNIT OPERATIONS: Five years' experience in the fields of Agitation, Drying or Grinding, Blending and Screening. Specialized knowledge of Heat Transfer, Fluid Flow and Mass transfer are desirable. Must be graduate. Consultation work.

INSTRUMENTATION ENGINEERS: Five or more years of progressively difficult experience in Instrument Research Development or Design. Must have broad and thorough knowledge of instrument theory and application. Should have some knowledge of Chemical Equipment and its operation. Must be graduate.

POWER ENGINEERS: Must have five to fifteen years' experience in some of the following: operating, testing and maintaining power plant equipment, supervising power plant operations, making cost and evaluation studies, heat balance work, power cost accounting, design and layout of power plants, and the selection and installation of power equipment. Must be graduate.

AIR CONDITIONING ENGINEERS: At least 7 years' experience in selection and operation of heating, air-conditioning, ventilating and refrigeration equipment. Well versed in the theory of thermodynamics, fluid flow and heat transfer. For consulting evaluation, and economic operation services. Must be graduate.

MAINTENANCE ENGINEERS: Five to ten years in planning maintenance work, establishing manpower and material requirements, scheduling and controlling work. Must be thoroughly familiar with Machine and Hand Tools used in Plant Maintenance Work. Must have supervised persons doing maintenance work. Must be graduate. For consultation work.

Give experience, education, age, references, personal history, salary received and salary expected. Please be complete and specific.

ALL INQUIRIES WILL BE CONSIDERED
PROMPTLY AND KEPT
CONFIDENTIAL

E. I. du Pont de Nemours & Co., (Inc.)
ENGINEERING DEPARTMENT PERSONNEL
Wilmington 98, Delaware

HELP WANTED

EXPERIENCED ACID SERVICE MAN. Man wanted to run two unit acid service station on salary and commission. Must be good salesman. Box 11054, Fort Worth, Texas.

NATIONALLY known manufacturer has good proposition for men who have retired from oil production or oil refining. No investment required. Write Box D-788, The Oil and Gas Journal, Tulsa, Oklahoma.

FOREIGN and Domestic Oil Employment Directory covering the oil industry, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla.

EXPERIENCED accountant, capable of supervising production accounting department of substantial Mid-Western independent company. Submit data and photo. Box D-797, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Chemical Engineers for process development and process design on petroleum refining and chemical processes. Prefer individuals with several years' experience in one or both of above fields. Southwest location. Write F. J. Heller, Research and Development Department, Phillips Petroleum Co., Bartlesville, Oklahoma.

LAND MAN WANTED—By small independent company to work out of Tulsa. Must be experienced and capable of handling own department. Best type, highest calibre, must own car. State qualifications, experience, salary expected in first letter. All replies confidential. Box D-820, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY ENGINEER: Minimum 3 to 5 years experience in refinery maintenance, construction and operation to act as assistant superintendent of substantial Midwestern Independent Refining Company. Write Box D-818, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL ENGINEER

New large oil pipeline company requires mechanical engineer to handle design, supervise construction, and devise maintenance procedures on all pump station equipment to 5000 HP, not including electric equipment. Station specifically includes 2000 HP maximum IC engine and centrifugal pump. Complete familiarity with high pressure oil piping required. Men under 35 preferred. Include full professional details and minimum salary first letter. Box D-781, The Oil and Gas Journal, Tulsa, Oklahoma.

AUSTRALIA
GAS AND FUEL CORPORATION OF VICTORIA

Applications returnable to the Secretary, Premier's Department, Melbourne, C.2, by 31st March, 1951, are invited for appointment to the Office of Chairman of Directors of the Gas and Fuel Corporation of Victoria, under the Gas and Fuel Corporation Act 1950.

The Corporation is empowered to carry on the businesses of production, sale and supply of Town Gas, the gasification of brown coal by the Lurgi high pressure gasification process, the recovery, manufacture and sale of coke, tar, pitch, ammonia, dyes and other residual and synthetic products, also by-products and residuals arising in the manufacture of Town Gas.

The salary is £5,000 per annum. Full details of the functions and scope of the Corporation are contained in the Victorian Gas and Fuel Corporation Act 1950, copy of which is available for perusal at the Office of the Australian Consulate General, New York.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

SITUATIONS WANTED

MECHANICAL ENGINEER desires change. 20 years design experience on heavy machinery, including draw works, blocks, pumps. Wants design work on oil country equipment. Box B-798, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING Contractor operating in West Texas and New Mexico desires to contact small or medium-sized independent oil company who needs an operating manager. Personal interview desired. Twenty years experience in all phases of the oil industry. Address replies to Box D-644, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST

with Ph.D.; experience in all phases domestic and foreign commercial geology. Specialist in regional structural and stratigraphic problems. Age 42. Location open. If your company is interested in this top geologist, please write

CHAS. J. LOVELESS PERSONNEL SERVICE
508 Mayo Building, Tulsa, Oklahoma

GEOLOGIST, 35, 8 yrs. exp. Texas Gulf Coast, subsurface, leasing, developing and making drilling deals. Wish to locate in Rocky Mt. Area with aggressive independent, moderate salary and interest. Box D-817, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER, 1 year experience petroleum engineering Lab. 2 Years drilling operations. Desires Domestic or Overseas position. Box D-802, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE

AVAILABLE in new, first-class condition bound volumes, years 1941 to 1945: The Oil and Gas Journal (10 vol.), Petr. Engr. (9 vol.), Refiner (9 vol.), Mech. Engr. (4 vol). Transactions-ASME (4 vol.), Applied Mechanics (2 vol.); also 13 volumes of National Geographic. Unbound: Chem., Met., and others. Price: $250.00 total or $5 per volume separately. Address: Box 8023, Dallas, Texas.

BUSINESS OPPORTUNITIES

INVESTMENT OPPORTUNITY

116,000 acres deeded land with oil and mineral possibilities, located on paved highway 55 miles from Albuquerque. Has thousands of acres of forage for livestock, several thousand acres suitable for mountain homesites, thousands of acres of thrifty Ponderosa Pine seedlings. Some 60 miles of mountain streams, rich with trout and game. Elevation 6,000 to 9,000 feet. Good climate, picturesque scenery. An outstanding value. Homesites alone may in time pay for entire property. Price $9.00 per acre. Write Ernest O. Buhler, Box 3530, Route 3, Albuquerque, N. M.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate. Legal Forms, Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa 3, Oklahoma.

LEASE AND DRILLING BLOCKS

HAVE 300 acres Ohio County, Ky., with well drilled to 600 ft. Will give one-half interest to investor for $3500 to complete. James P. Friel, 4 So. 15th St. Phila. 2, Pa.

FOR LEASE: Sections 74, 75, 76, 78, 104 Block B-2, H. & G. N. Ry. Co. Gray County, Texas. Proven production. Southeast of Pampa. For more information write: Box D-815, The Oil and Gas Journal, Tulsa, Oklahoma.

TRADE: Casing and tubing for ground floor interest in proven or semi-proven production. Principals only, send full details to Box D-800, The Oil and Gas Journal, Tulsa, Okla.

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

ROYALTIES

SPOT CASH PAID FOR PRODUCING ROYALTY. SMALL TO LARGEST BLOCKS IN SETTLED OR OLD PRODUCTION ONLY. Oil Specialists since 1904. GERBER & CO., 120 WALL STREET, NEW YORK, N. Y.

SELLING 5% override, 400 acres, North Kaycee Unit, Johnson County, Wyoming. Continental has contract for test. Box D-811, The Oil and Gas Journal, Tulsa, Oklahoma.

WE will buy producing or non-producing oil royalties. Standard Security Company, 115 Broadway, New York 6.

MONTANA ROYALTIES

Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225 Great Falls, Montana.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418 815-15th Street, N.W., Washington 5, D. C.

WANTED

OIL DEALS WANTED—We have pipe and cash available for immediate drilling for deals up to four thousand feet in Oklahoma. Must have good geology; bona fide deals only. Box D-821, The Oil and Gas Journal, Tulsa, Oklahoma.

Big Supertankers Planned

Construction in the near future of still larger supertankers of the 40,000-ton size for hauling crude from the Persian Gulf is now being actively discussed by United States operators, according to Walter L. Green, president of the American Bureau of Shipping.

At the annual meeting of the Society of Naval Architects and Marine Engineers last week in New York, Green said preliminary planning for such vessels has been under way for some time, though no designs have been completed or orders placed.

Operating economies is the reason for the marked postwar trend in the construction of larger tankers. The vessels now under discussion would provide an increase of about a third in lift capacity over the largest tankers now afloat without any appreciable increase in operating cost. Size of present supertankers, all built in the last few years, ranges up to about 30,000 tons.

The new ships would be capable of a speed of about 18 knots, maximum, and in some cases have a 750-ft. over-all length, or almost 100 ft. longer than the liner America, now the largest American flag merchant vessel afloat.

ECA O.K.'s Morocco Funds

The Economic Cooperation Administration has approved the use of the equivalent of $17,000,000 in Marshall-plan counterpart funds for development of the resources of French Morocco, of which about $300,000 has

been allocated for continuation of prospecting for oil and minerals.

The ECA said the search for oil will be centered in north-central Morocco where a field was found from which small quantities of crude were produced commercially before the war.

Spanish Shale-Oil Report

A report on the facilities in the Puertollano area of Ciudad Real Province, Spain, where oil shale has been mined, and shale oil refined commercially since 1922, has been published by the Bureau of Mines. Copies of the report, titled "Oil Shale in Spain" (Report of Investigations 4736), may be obtained without charge from the bureau's publications distribution section, 4800 Forbes Street, Pittsburgh 13.

The Puertollano plant was one of a number of foreign commercial oil-shale establishments visited by bureau technologists as part of its synthetic liquid-fuels program. The shale deposit is estimated to contain 100,000,000 tons of minable shale and present run-of-mine output has an average assay value of 36 gal. of oil a ton. It is estimated enough shale is available for 40 years' operation at the rate of 1,600,000 bbl. of crude oil a year, or something more than 20 per cent of Spain's present total demand for crude of 7,500,000 bbl.

The report was prepared by H. M. Thorne, chief of the oil-shale research and development branch at Laramie, Wyo., and A. J. Kraemer, bureau refinery engineer at Washington.

Construction Firms Active

Three construction companies, two American and one Italian, are reported to be active in Colombia in connection with the various products pipe-line projects in that country.

Reports from Bogota are that Carolina Construction Co., Houston, has contracted the 103-mile, 6-in. line to be built from Puerto Berrio-Medellin to carry some 4,500 bbl. daily. Cost is $2,800,000. Williams Brothers is now surveying the route for the projected line from Puerto Salgar to Bogota. The third contracting company is Techint, S.A., which now has a representative in Colombia for bidding on pipe-line projects.

Solvents Production

Standard Francaise de Petroles, the French affiliate of Standard Oil Co. (N. J.), is now carrying out petroleum byproduct operations in France. The company is producing solvents at Marseilles and Port Jerome, and weed killers and similar material at La Meilleraye. Detergents and antifreeze are manufactured by the Standard Kuhlmann de l'Estaque.

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CALENDAR OF EVENTS

The Calendar of Events will be found on page 20 of this issue, immediately following the feature "They Say."

German Exploration Up

The current tempo of oil exploration in Western Germany is reflected in reports showing a new all-time high in total footage drilled.

During July, latest month for which data is available, German operators drilled 39,513 m. (about 131,000 ft.). More than 19,000 m. (about 62,000 ft.) was in exploration and extension wells. The exploration drilling accounting for 9,883 m. (about 32,400 ft.).

The total drilled during the month is an increase of about 50 per cent over July of last year. Drilling also is increasing outside the present producing areas in the Emsland and Hanover districts. Wildcats have been started in Bavaria and Wuerttemberg, in Oldenburg, Ostfriesland, and Schleswig-Holstein.

One particular Western German area of current interest is in the district near the Hase and Hunte rivers. Work here has been stimulated by the discoveries in Quakenbrueck and St. Huelfe near Diepholz. Among other operations, drilling is to be resumed on the Apeldorn, Lastrup, and Menslage anticlines.

Although the discovery record to date in Western Germany is probably the best of any in Western Europe over the last 2½ years, some individual tests have been disappointing. No satisfactory results have been obtained thus far in production tests carried out in wells near Barrigsen southwest of Hanover and at Lehrte and Vordorf near Brunswick.

Exploration Work Started

Eight members of Seismograph Services, Ltd., left London by air recently for Papua in New Guinea where they will carry out exploration work under contract to Australasian Petroleum Co., Pty., Ltd.

The Australasian company, in which the capital is held by Anglo-Iranian Oil Co., Ltd., Standard-Vacuum Oil Co., and an Australian company, Oil Search, Ltd., now has three rigs running in its effort to develop production in this part of New Guinea.

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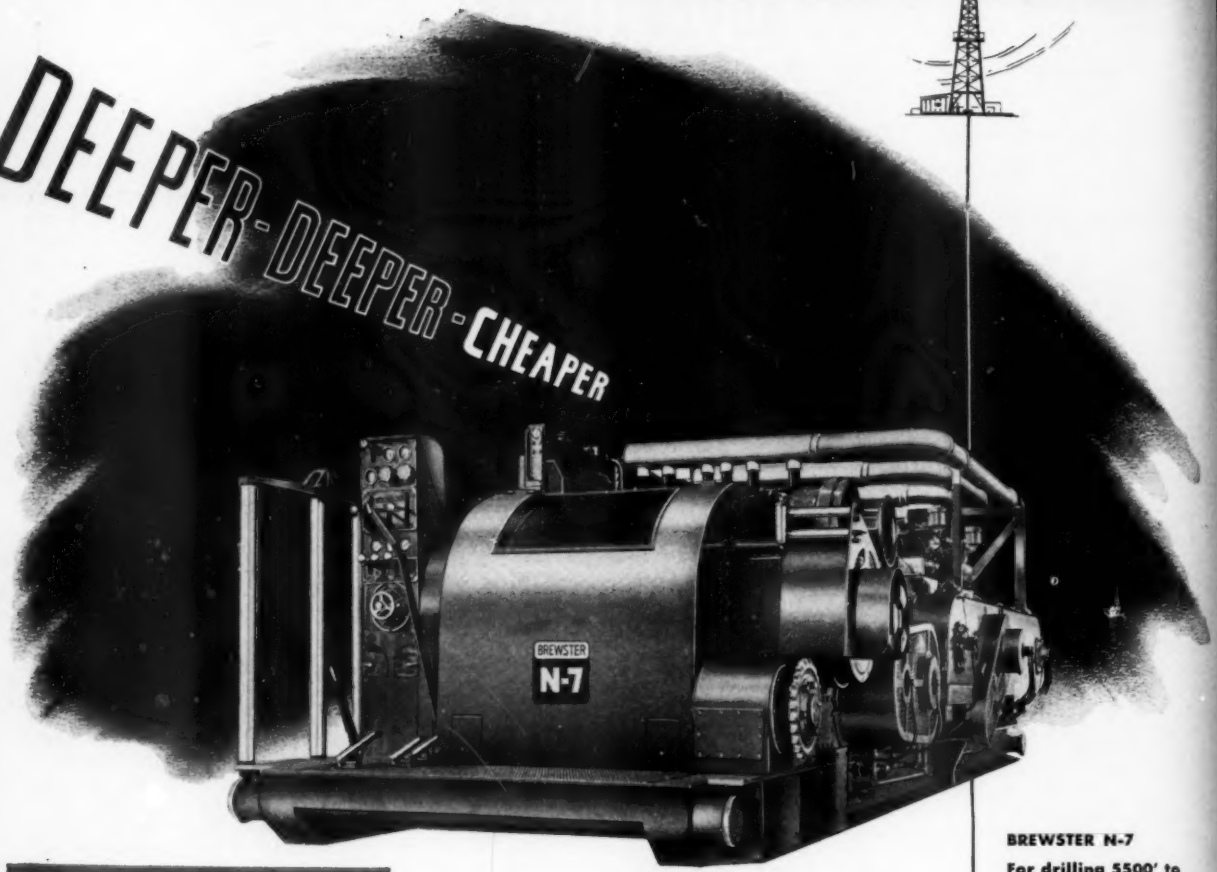

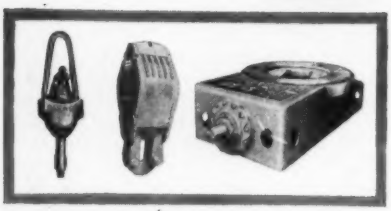

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